Farm Chemicals

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Pioneer Journal
of the Industry

Nematocide
Market 46

Spray's First
Fifty Years . . . 50

Insecticides . . 54

Spring
Meeting 56

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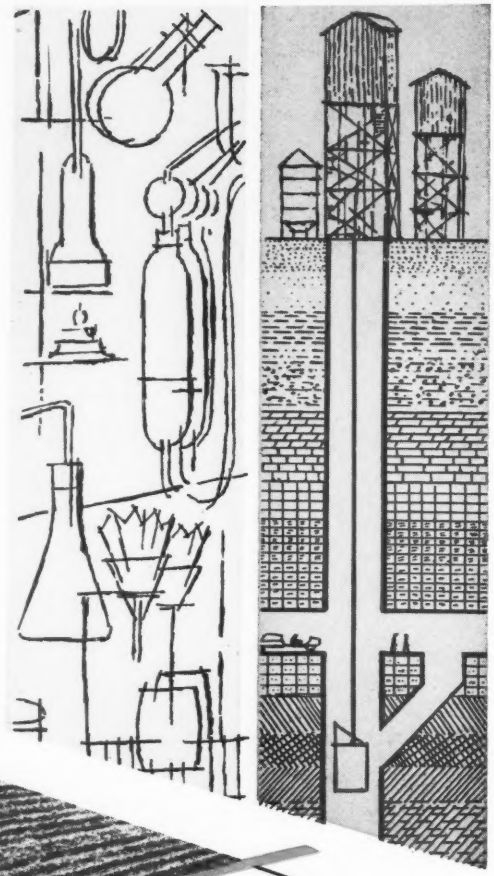
Vol. 120 No. 3 MARCH 1957 50 Cents

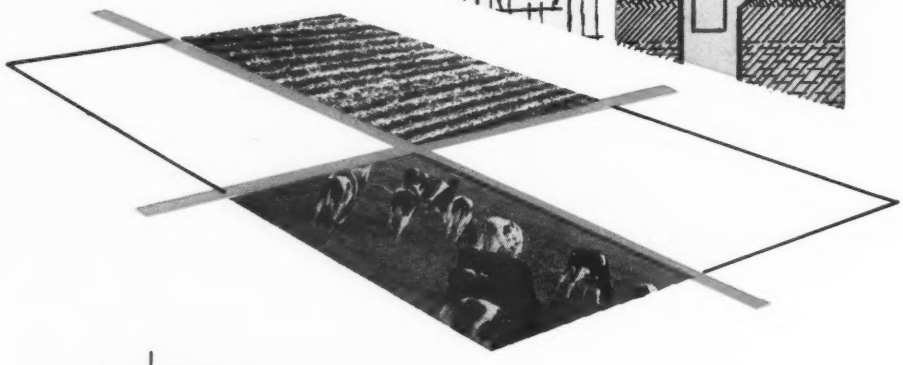
LOOK TO NATIONAL POTASH FOR QUALITY AND SERVICE

Backed by the skills and experience of its parent companies – Pittsburgh Consolidation Coal Company and Freeport Sulphur Company – NATIONAL POTASH offers important advantages as a dependable source of quality potash.

NATIONAL'S mining operations and refining processes will include the very latest industry techniques, and its storage and shipping facilities have been planned to meet efficiently the demand of the peak fertilizer season.

In addition, NATIONAL POTASH provides a free, comprehensive Technical Service to help manufacturers with granulation, formulation and other production problems. Write for complete information.





NATIONAL POTASH COMPANY

205 EAST 42nd ST. • NEW YORK 17, N.Y.

North*South*East*West

HERE COMES

HEPTACHLOR

with a bigger and better than ever

new coast-to-coast ***HEPTACHLOR*** *promotional campaign!*

featuring

THE "HARVEST MORE WITH HEPTACHLOR" FORAGE INSECT CAMPAIGN

THE "STOP 'EM DEAD AND BE $$ AHEAD" HEPTACHLOR SOIL INSECT CAMPAIGN

. . . complete, unified, intensive promotions including farm papers, newspapers, dealer promotional material, direct mail and strong national publicity! Here's real power to back up your selling in key areas throughout the country!

Followed by . . . SEED TREATMENT CAMPAIGN • COTTON INSECTS CAMPAIGN VEGETABLE INSECTS CAMPAIGN • TOBACCO INSECTS CAMPAIGN . . . and many other bigger and better than ever special regional promotions!

NEWS! VELSICOL WILL HAVE METHYL PARATHION AVAILABLE FOR THE COMING COTTON GROWING SEASON!

ALL THIS PLUS HEPTACHLOR'S PROVEN SUPERIORITY!

Heptachlor's ahead on preference, demand, and proven performance! It's accepted by state and Federal experiment stations, proven by years of successful use in the field, and in demand with farmers everywhere for its economy, ease of use, and versatile effectiveness!

HEPTACHLOR FORMULATORS ACT NOW! Tie-in now for the hottest selling year you've ever had! Mail this coupon now for complete information!

VELSICOL **CHEMICAL CORPORATION**
330 East Grand Avenue, Chicago 11, Illinois

VELSICOL CHEMICAL CORPORATION FC-37
330 East Grand Avenue, Chicago 11, Illinois
Please send information about the 1957 Heptachlor

☐ Forage Insect Campaign ☐ Soil Insect campaign
☐ Other promotional campaigns

Name_____

Company_____

Address_____

City_____ Zone____ State_____

Farm Chemicals

MARCH, 1957
No. 3
Vol. 120

Pioneer Journal of Farm Chemicals Industry, Est. 1894

INDUSTRY NEWS

Business & Management... 6
Associations & Meetings... 14
People... 12
Government... 26
Calendar... 24

FEATURES

The Nematocide Market... 46
A. L. Taylor
Pumps Can Solve Your Flow-Control Problems... 48
H. M. Godson
Calspray's First Fifty Years... 50
Mexico's "New Look"... 53
Emil Zubryn
Future Bright for Soil Insecticides... 54
Dr. Roger W. Roth
NAC Spring Meeting... 56

DEPARTMENTS

Viewing Washington
On Agriculture... 29
On Business... 30
Reader Service... 37
Equipment & Supplies... 58
Suppliers' Briefs... 59
Patent Reviews... 60
Dr. Melvin Nord
Chemicals... 62
Pest Reports... 63
Statistics... 65
Markets... 66
Buyers' Guide... 71

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In this issue . . .

A "Nematology Workshop" is almost a new concept in the communication of information to field workers, at least in the nematology field. The workshop sponsored by the Shell Chemical Corporation proved to be a great success. One of highlights of the meeting to our way of thinking was the talk by Mr. A. L. Taylor of USDA. We also think that you will find Mr. Taylor's talk on "The Nematocide Market" on page 46 interesting.

Starting on page 50 is story of growth. It illustrates the value of "service to the customer." From a meager beginning, two men to be exact, it has grown into one of the giants of the agricultural chemical industry. We hope you will enjoy "Calspray's First Fifty Years."

There have been some interesting developments in the Mexican fertilizer industry recently. We have covered these in a story on page 53 called "Mexico's New Look."

Dr. Roger W. Roth of the Velsicol Chemical Corporation, found that the introduction of a new idea to be a complex problem. Patience was needed during the prolonged "wait and see" period. But it paid off, for chemical insecticides for soil treatment represent one of the most important post war developments in agriculture. His story is on page 54.

Cover story

This is a picture of W. H. Volck, an entomologist, and one of the founders of the California Spray-Chemical Corporation. It was in such a lab that Volck and a young chemist named Luther discovered a new method of making lead arsenate. This discovery saved the apple industry in the Pajaro Valley in California and served as the beginning of Calspray.

"Even *wet* they're strong...

and burlap is easy to grasp," says Harlan Jackson, Montgomery, Ala. farmer. "I always order my fertilizer in burlap bags. I can sell the empties or use them around the farm. We can't afford costly delays and spillage because of torn containers—that's why we always use burlap bags. They're strong—they won't burst—and we can handle them as roughly as we want."

This farmer likes fertilizer in burlap bags that are easy to grasp and don't tear. How about your own handling and spillage problems? *What bag is strong even when wet?*

Just ask your own customers—

they'll tell you that burlap

Is strong — takes dragging, dropping, *man-handling* — any tough job on the farm.

Gives good ventilation — keeps farm supplies and products fresh.

Laughs at sudden showers — wetness or dampness can't weaken it.

Saves money — extra value from re-sale and re-use.

Saves storage space — stacks to any height without slipping.

Has 1000 uses — always in demand on the farm (popular with farm wives, too!)

THE BURLAP COUNCIL

of the Indian Jute Mills Association

155 East 44th Street, New York 17, N. Y.

Now—for direct application . . .

highest quality . . granulated triple super

Just one trip across the field with this dustless, easy-to-handle, granulated 0-45-0 will make a repeat customer out of a trial user. Cash in now on spring sales.

Builds customer satisfaction and repeat sales

You'll like the compliments you'll get after your customers have tried your new 0-45-0 from International for the first time.

Look at typical comments from users of this high-quality triple:

"It sure goes on easy." (You bet it does! It's granulated for easy going through any fertilizing rig.)

"Pleasure to use." (Yes . . . and just one downwind trip across the field will prove it to anyone . . . will build more repeat sales than a dozen sales talks.)

"Saves time and money." (Now your customers can avoid breaking up lumps in the bag or stopping in the middle of a field to kick a clogged-up rig. Easy to handle . . . just fill the fertilizer hopper and push off. Easy to put on.)

What's more, agronomists can tell you the high availability of this superior product delivers results that build farmer satisfaction and repeat sales. The reason: special processing and manufacturing care produces a triple that resists reversion in the soil . . . supplies growing plants the phosphorus they need when they need it.

Call or write International today for samples and complete details.

free-flowing...top-performing that sells itself on sight

*bagged under your own label... shipped direct to your dealers**

Here's a new triple super you'll be proud to add to your own line of fertilizers . . . the new, granulated 0-45-0 from International Minerals and Chemical.

This superior triple can be shipped in bulk, or International will be happy to have it bagged in adequate quantities under your own label . . . ship direct to your own dealers, too, if you like.

Here's what this can mean to you:

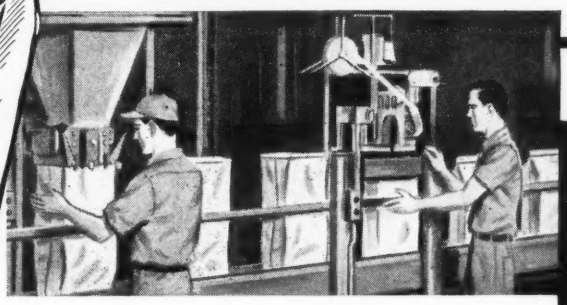
- A top-quality triple super that carries your own private label and complements the rest of your line.
- A modern, easy-to-use, top-performing triple super that will bring you increased customer satisfaction and plenty of repeat sales.
- The unbeatable convenience of distributing this high-quality product under your own brand name direct to your dealers without touching a single bag.

What's more, you'll find that dealing with International is a pleasure. You'll appreciate the friendly cooperation from International's transportation department . . . the fast service . . . and the reliability of supply.

See your International triple-super sales representative soon for complete details on minimum order requirements, price and delivery information. He'll be glad to show you samples. And one look at this new 0-45-0 will show you why you can't get a better deal than this new triple super now available for direct application sales.

**subject to minimum order requirements*

Profit now from this superior 0-45-0. Bagged under your own brand name.



Superior texture of this new triple super, put up in your own bags, stores without caking. It's granulated for easy going through any fertilizer attachment.

MINERALS International CHEMICALS

PHOSPHATE CHEMICALS DIVISION

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago 6

PLAN $4 MILLION TRANSFER STATION IN LA.

A $4 million river transfer station will soon be erected near Wood Park, La., according to a recent joint announcement by Cyrus S. Eaton, board chairman of West Kentucky Coal Co., and Mark Easton, Jr., president of River and Gulf Transfer Co.

Expected to handle more than two million tons of phosphates and coal annually, the station is designed to transfer phosphates from ocean-going equipment to river barges and coal from Mississippi River barges to ocean-going ships.

The station was designed and will be constructed by W. Horace Williams Div., Williams-McWilliams Industries. Traveling unloaders were designed and will be constructed and installed by Mead-Morrison Div., McKiernan-Terry Corp.

CORONET SETS NEW SAFETY RECORD IN '56

The Tenoroc Mine of Coronet Phosphate Co., a division of Smith-Douglass Co., Inc. has set a new record by completing 1956 without a single lost-time accident, reports Vernon S. Gornto, Smith-Douglass safety director.

Located east of Lakeland, Fla., the mine operates three large draglines, a washer and flotation plant, drying plant and grinding plant. Since the last lost-time accident occurred March 18, 1954, 1,156,000 man hours have been completed without disabling injury.

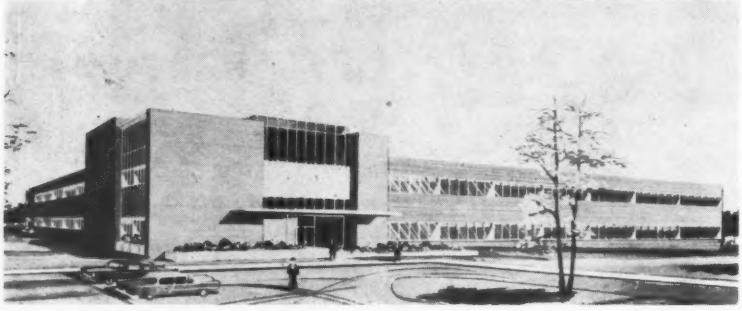
GROUND BROKEN FOR ATLAS TECH. CENTER

Atlas Powder Co. recently broke ground for a $3,000,000 Technical Center which will enable the firm to expand its technical service to the farm chemicals industry and intensify its long-range basic research program.

To be located adjacent to the Atlas general offices in a suburban area near Wilmington, Del., it is scheduled for completion by the end of the year.

Both design and construction of the new building and being carried out by H. K. Ferguson Co., which also built the company's general office building two years ago.

Architect's drawing shows Atlas Powder's Technical Center



NEW NO. CENTRAL HQ FOR OM PLANT FOOD

Operations of the North Central district of Olin-Mathieson Chemical Corp.'s Plant Food Div. recently were consolidated in new headquarters at 800 South 72nd St., Omaha.

S. Y. Roth, district manager, said that the district sales office, established just a year ago, required additional space to handle its expanding business. In addition, warehousing facilities for pesticides now adjoin the sales office, which will expedite order handling.

HERCULES SALES AT NEW HIGH, INCOME DOWN

Hercules powder Co. in its 1956 report to stockholders showed an all-time high of $235,903,000 in net sales and operating revenues, an increase of 4 per cent over last year.

Net income after all charges was $17,703,000, equal to $2.13 a share of common stock. This represented a decline from 1955 when net income totaled $19,013,000, equal to $2.30 a share of common stock.

During the year, Hercules spent approximately $34,500,000 for new facilities, two and a half-times the amount spent for that purpose in 1955, and expenditures for research reached an all-time high for the firm of $10,504,000.

FORM CREDIT UNION AT COOP. FARM CHEM. ASSN.

Employees of the Cooperative Farm Chemical Association, Lawrence, Kans., recently formed their own credit union, the Kansas Credit Union League reports.

About 285 employees and their families are eligible to join the new group, named the CFCA Employees Credit Union. It is owned and operated entirely by its employee-members under law and government supervision.

FARM CHEMICALS

Business & Management

BEGIN OPERATIONS AT IMC FAIRFAX PLANT

Production started last month at Fairfax, Minn., in the first fertilizer plant in this country ever to be constructed entirely of precast concrete, reports International Minerals & Chemical Corp.'s Plant Food Div.

Exterior walls and interior bulkheads, made entirely of concrete, are said to offer distinct advantages in material handling and provide for easy expansion of the plant to the south and east.

The single-story IM Cplant occupies a 100 x 140 foot area on a 40-acre site a mile and a half west of Fairfax. It provides 10,000 square feet of storage space, capable of handling about 25,000 tons of fertilizer annually, and about 4,000 square feet of manufacturing area.

E. P. Ruszat, former Mason City plant superintendent, will operate the Fairfax plant.

CALCIUM CARBONATE MOVES TO QUINCY, ILL.

General offices of the Calcium Carbonate Co. last month were moved from Chicago to 520 South 4th St., Quincy, Ill. Leo Knapp, vice president and general manager of the company, will be in charge of the Quincy office.

Concurrent with the move to Quincy, a branch office is being opened in the Board of Trade Building, 141 West Jackson Blvd., Chicago, to be headed by Ed Horst, sales manager of the company's Feed Div.

INCORPORATIONS

Campbell Fertilizer Co., Inc., Gueydan, La., has been granted a charter of incorporation. The firm will engage in retailing, wholesaling and distributing fertilizers. Capital stock is listed at $15,000.

Hydro-Pak Co. recently was granted a charter in Savannah, Ga., to engage in the manufacture and sale of fertilizers, chemicals and other substances to increase the productivity of waters Incorporators: Henry M. Dunn, B. B. Cubbedge and E. Ormonde Hunter. Capital stock: $30,000.

ASHCRAFT-WILK. NAMED GEIGY FLA. AGENTS

Geigy Agricultural Chemicals has announced appointment of Ashcraft-Wilkinson Co. as sales agents in Florida for its Sequestrene Iron Chelates.

A few years ago, Geigy introduced its Sequestrene NaFe Iron Chelates for the correction of iron chlorosis in citrus, and during the past year began marketing Sequestrene NaFe Iron Chelate Pellets.

Geigy will continue to maintain stocks at the Robertson Warehouse in Orlando and Flag Sulphur & Chemical Co. in Tampa.

FEDERAL CHEMICAL SALES GATHERING

Scene at Federal Chemical's Sales Meeting in Louisville

Federal Chemical Co. recently held its general sales meeting to kickoff the 1957 promotion of its new product, Federal Graduated fertilizer.

More than 75 sales representatives from ten states and company officials gathered for sales and advertising sessions in the Terrace Room of the Kentucky Hotel, Louisville, during the two-day meeting.

Founded in 1884, Federal Chemical serves a territory including the states of Kentucky, Tennessee, Ohio, Indiana and Illinois and portions of Alabama, Mississippi, Missouri, Michigan and Wisconsin.

AP&C OPENS $200,000 RESEARCH ADDITION

A $200,000 addition to American Potash & Chemical Corp.'s Whittier, Calif., research laboratory was opened recently as part of the company's expanding research program.

Doubling previous workroom space, the new addition consists of three four-man labs, two three-man labs, a small lab for micro-analytical work, two large labs for process development and other rooms for allied uses.

In his talk at the opening ceremonies, Peter Colefax, company president, pointed out that AP&C has tripled its research budget and investment in research facilities in recent years.

Important among research programs conducted by the firm, said Colefax, have been those concerned with lithium carbonate, lithium hydroxide, boric oxide, elemental boron, borate esters, phosphoroborine compounds, and parathion.

New-Style PAYLOADER® DOUBLES PRODUCTION

WITHOUT INCREASING LABOR COSTS

How to keep up with production demand yet hold down production costs in the face of more competitive markets, tighter labor supplies and rising labor costs? . . . One proven solution is to increase output per man by providing your operators with the most modern, most productive machines available. In the field of bulk or loose materials handling, the answer is "PAYLOADER" tractor-shovels. They are built by the pioneer and leader in the tractor-shovel industry and there are *more* "PAYLOADER" units in use than all other makes combined. Industrial plants that have been "PAYLOADER" users for years tell us that it has paid them well to replace older units with the new, more productive "PAYLOADER" models . . . that they not only handle more tonnage than earlier models, but are also way ahead of other tractor-shovels in design and in the features that make them MORE PRODUCTIVE. There is a size and type to meet every need.

• MORE TONS per man hour

DIGS MORE

The new-model HA "PAYLOADER" is especially designed for fast, low-cost materials handling — indoors and outdoors. Rear-wheel-steer and compact design makes it easy to maneuver in close quarters. The distinctive bucket action with powerful, 40° break-out and tip-back at ground level digs heaping loads quickly.

CARRIES MORE

Heaped loads are cradled close and low for greater stability while carrying. Hydraulic system load-shock-absorber cushions the load, smooths the ride and permits faster movement with less spillage and greater safety. Torque converter drive makes for smooth, fast starts, quick maneuvering and easier control.

DELIVERS MORE

It's the tonnage delivered per hour that counts. Since you get MORE load to begin with, and keep MORE while traveling at higher speeds . . . with less spillage in both instances . . . the result is you *deliver* more tons per load and more loads per man-hour, hour after hour and day after day.

Better Engineered for Better Performance

Shortest Turning Radius — The model HA can work where others can't because it has a shorter turning radius than any comparable tractor-shovel — goes through doorways and spaces less than 4½ feet wide — easily turns corners of 6 foot aisles.

Higher Dumping Height — The model HA can deliver its loads over bin and hopper edges up to 6½ feet high. Loads can be dumped as fast or slow as desired at any height.

Biggest Capacity — With a bucket capacity of 18 cubic feet payload, and 14 cubic feet struck, the model HA has a carrying capacity up to 25 percent greater than comparative machines—and more than some bigger, heavier machines.

Easiest Operating — The entire hydraulic control of the model HA bucket — tip-back, raise, dump and lower — is handled by a single conveniently located lever. It's the simplest, easiest bucket control available.

WANT PROOF? If you are using a "PAYLOADER" that is more than 2 years old, ask your "PAYLOADER" distributor for a demonstration of the latest model, and see how much more work your operator can turn out — and how much more than with any other comparable size machine. Call him today.

SAY "NUFF"

PAYLOADER®

MANUFACTURED BY

THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.

704 Sunnyside Ave., Libertyville, Ill.

Send full data on "PAYLOADER" tractor-shovels as follows:

☐ Front-wheel-drive models HA (18 cu. ft.) and HAH (1 cu. yd.)

☐ Larger models (including 4-wheel drives up to 2¼ cu. yd.)

Name _____

Title _____

Company _____

Street _____

City _____ State _____

43

FARM CHEMICALS

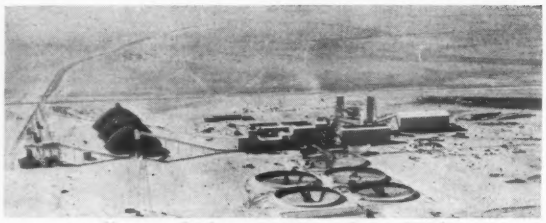
Business & Management

NAUGATUCK TRIPLES BETHANY LABS, OFFICES

Naugatuck Chemical Div., U. S. Rubber Co., is tripling laboratory and office space at its agricultural chemical research station and experimental farm at Bethany, Conn., according to a recent announcement.

Construction is now under way and the new unit is expected to be completed by Spring. The additional floor space will be used for individual laboratories, a large conference room and library.

NP MAKES INITIAL SHIPMENT



Shipping facilities, storage, refinery, head frames and in foreground, 5 thickeners.

In February, initial shipments of potash were made from National Potash Co.'s facilities near Carlsbad, N. M., according to an announcement by Richard C. Wells, president.

Designed capacity of the $17.5 million facilities is 400,000 tons of high grade muriate of potash annually.

In addition to the refinery, facilities include two 1,800-feet deep shafts—deepest in the U. S. potash industry—plus a 21-mile water pipeline and product storage buildings with capacity of more than 100,000 tons.

National's Sales Department, headed by vice president William B. Porterfield, Jr. has established a regional office at 212 Bell Building, Montgomery, Ala. and it has representatives throughout the country.

The firm is owned jointly by Freeport Sulphur Co. and Pittsburgh Consolidation Coal Co.

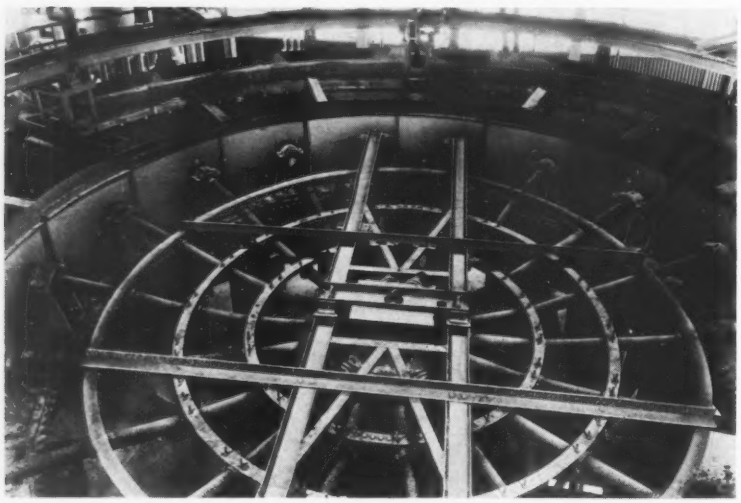
USI PLANT GOES ON STREAM

A new phosphoric acid plant has just been completed and put on-stream by U. S. Industrial Chemicals Co., it has been announced by Dr. R. E. Hulse, vice president of National Distillers Corp. and general manager of the USI Division. Capacity of the plant is 30,000 tons per year expressed as P_2O_5 (equivalent to about 60,000 tons per year of 75 per cent phosphoric acid).

The wet-process phosphoric acid is made from phosphate rock and sulfuric acid in the new plant which was designed and constructed by Singmaster and Breyer to use a process licensed from S. A. Metallurgique de Prayon, a Belgian company. Sulfuric acid used is spent acid from the neighboring plant of National Distillers.

USI reports that the installation is the first in the country built primarily to supply phosphoric acid to fertilizer manufacturers.

Giant filter, heart of the process at USI's phosphoric acid plant



ECORSE, MICH. SITE FOR NEW DUPONT PLANT

DuPont Co. reports it will build a new modern sulfuric acid plant on the Detroit River at Ecorse, Mich., about eight miles south of Detroit. To be located on the company's present plant site, the unit will replace an existing plant which has become obsolete.

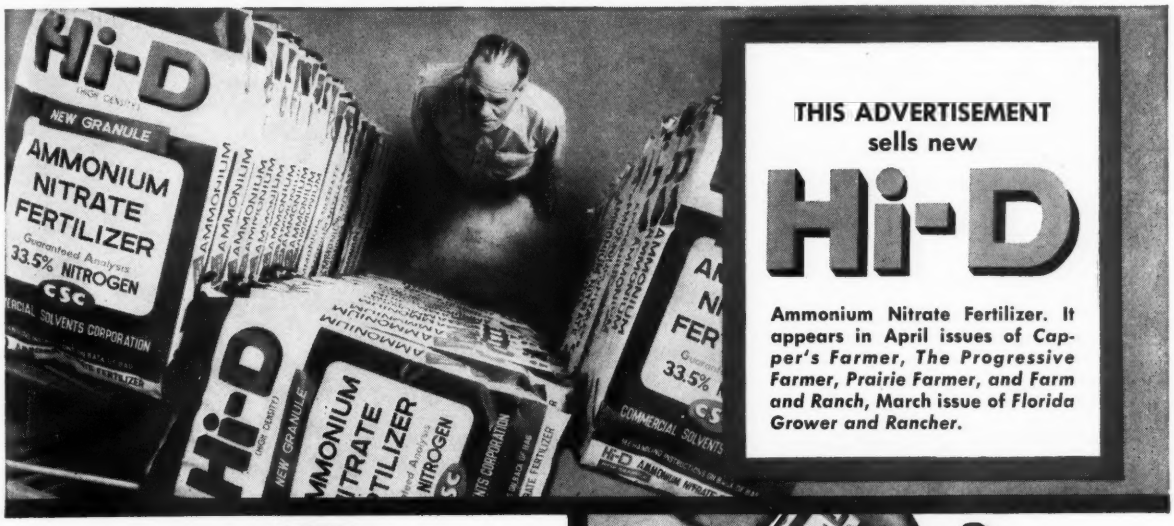
The new facilities will substantially expand production, said Clark W. Davis, general manager of the Grasselli Chemicals Dept., although no increase in employment is expected.

Present production of sulfuric acid will not be interrupted, since the old plant will not be dismantled until the new plant is in operation. Construction is expected to begin this month, with completion planned for 1958.

The new plant is the sixth new unit in DuPont's post-World War II modernization program of sulfuric acid manufacturing facilities.

NEWEST NITROGEN FERTILIZER

at your dealer's now!


Hi-D
NEW GRANULE
AMMONIUM NITRATE FERTILIZER
Guaranteed Analysis
33.5% NITROGEN
CSC
COMMERCIAL SOLVENTS CORPORATION
THIS ADVERTISEMENT
sells new
Hi-D
Ammonium Nitrate Fertilizer. It appears in April issues of Capper's Farmer, The Progressive Farmer, Prairie Farmer, and Farm and Ranch, March issue of Florida Grower and Rancher.

see a sample at your dealer's

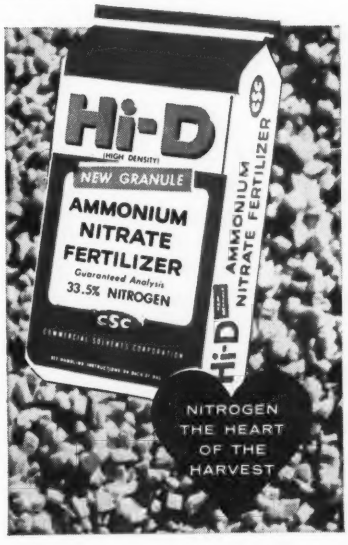
no other ammonium nitrate like it!

Ask your dealer for a sample. See for yourself the advantages of using new Hi-D. An exclusive patented process produces a high density ammonium nitrate with the maximum moisture "squeezed" out. Hi-D is made dry, coated dry and bagged dry. In addition, the controlled size and unique shape of these new granules assure even distribution in all types of spreading operations under all field conditions. Hi-D flows freely, spreads evenly, stays put. It won't gum-up, clog, cake or bridge even on hot, humid days.

Hi-D Ammonium Nitrate contains the 2 key types of nitrogen – the kind of nitrogen in sodium nitrate *and* the kind in ammonium sulphate as well! That's not all. 100 pounds of Hi-D gives you as much nitrogen as 159 pounds of ammonium sulphate or as much nitrogen as 209 pounds of sodium nitrate! The total nitrogen in Hi-D, guaranteed at 33.5%, gives 2-speed fertilizing action. 16.75% *nitrate* nitrogen goes to work fast for good, vigorous starts. 16.75% *ammonia* nitrogen follows up later for a sustaining boost to growth.

There's another kind of value in Hi-D, too. Its high density means less bulk – 10 bags stack in the same space as 8 bags of other types of nitrate. In the field this means you get up to 25% more nitrogen from a normal hopper load – you cover more ground per load.

Put the crop-boosting power of Hi-D to work for you this season. And remember, Hi-D should be just one part of your program for productivity. Don't forget – there's no substitute for balanced fertilizers. And, as a nitrogen supplement to the balanced fertilizer your dealer recommends, there's nothing better than Hi-D. See your dealer. Ask for Hi-D – in the green and white bag. You can trust Hi-D in the field and in the yield.



COMMERCIAL SOLVENTS CORPORATION – STERLINGTON, LA. – ST. LOUIS, MO. – ATLANTA, GA. – TERRE HAUTE, IND.

FARM CHEMICALS People

American Potash & Chemical Corp. Frank McGrane has been named head of a newly formed section which will handle fertilizer, fumigant and insecticide products manufactured at the firm's Los Angeles and Trona plants. Al Swain, former manager of agricultural chemical sales for the Los Angeles plant, becomes a company consultant.

McGrane

Atlas Powder Co. has named Stanley J. Dumovich as salesman in its Houston, Tex., chemicals sales office, succeeding Latane deS. Lamb, who has resigned.

Battelle Memorial Institute. Dr. Maynard M. Baldwin, with Battelle since 1938, has been appointed a technical director.

Brea Chemicals, Inc. New assistant manager of agricultural chemical sales is Robert G. Hickle, former central Calif. district sales manager.

Hickle

The company also has reorganized its marketing area, increasing its sales districts from five to eight.

Carnegie Chemical Mfg. Corp. Election of Henry P. Zari as vice president and his appointment as executive assistant recently were announced.

Commercial Solvents Corp. has elected Monroe C. Gutman as a director.

Diamond Alkali Co., Chlorinated Products Div. Promotion of L. J. Polite, Jr., to product sales manager is announced by Loren P. Scoville, general manager. Robert C. Sutter, former assistant director of engineering for the firm, has been named to the newly-created position of operations manager for the division.

Diamond Black Leaf Co. Bernard Clayton becomes district manager of DBL's Western District Sales office in San Jose, Cal.

Dow Chemical Co. Responsibilities of Tyrone Gillespie, assistant to the president, have been increased to include coordination of overseas activities for the firm.

Du Pont Co., Polychemicals Dept. Three technical specialists in the field have been appointed to provide customer services for "Uramon" ammonia liquors: Ove F. Jensen for the Midwestern states; John Spicer, Jr., for the Southeastern states and Dr. Philip B. Turner for the Northeastern states.

Retirement of Dr. J. A. Almquist as assistant general manager of the Polychemials Dept. results in three management changes: Walter H. Salzenberg, assistant general manager of Grasselli Chemicals Dept. succeeds Almquist; Wallace Gordon, director of DuPont's Advertising Dept. replaces Salzenberg in the Grasselli Dept. and Frederic A. C. Wardenburg, director of sales, Pigments Dept., becomes director, Advertising Dept.

Federal Chemical Co. At a recent meeting of the Board, R. McKay Shehan was elected treasurer, suceeding W. Quinn Harned who died in September. J. Walter Harding was elected secretary of the firm replacing F. H. Courtenay, who has resigned to go with Carrier Conveyor Corp.

Harding

Lebanon Chemical Corp.

Troxel

New sales manager is Robert B. Troxel, a member of the Lebanon sales staff since 1949. He has been botanist for the Commonwealth of Penna. and served briefly in the Agricultural Chemical Div. of a large paint manufacturer.

Monsanto Chemical Co. Edward R. Pullen of Portland, Ore., has been appointed northwestern sales representative for the farm chemicals marketed by Monsanto's Organic Chemicals Div. Operating from Portland, he will cover the states of Oregon, Washington, Idaho and Montana.

Pullen

National Potash Co. Robert L. Harper and James A. Hunter

have been named sales representatives. Harper will represent the firm in the territory west of Chicago, and Hunter will cover northeastern U. S. and Quebec.

Sydney H. Rogers joins NP as assistant sales manager. A graduate of Yale University and Harvard Business School, he had been manager of out-of-town sales for Spring Mills, Inc., New York.

Rogers

Pittsburgh Coke & Chemical Co. has named William T. McLaughlin project manager, commercial development.

Spencer Chemical Co. announces election of five new vice presidents: J. C. Denton, vice president—agricultural chemicals; H. R. Dinges—industrial chemicals; Frank Pyle—plastics; Dr. John R. Brown, Jr.—research and development and E. V. Friedrich —administration.

Stauffer Chemical Co. William Arnold Sikkel has joined the Agricultural Div. as a salesman in the Midwest region.

Charles F. McMackin has been named superintendent of the Portland, Ore., plant, succeeding John B. Gay, recently named plant manager at Vernon, Calif.

The Texas Co. Dr. C. Loyal W. Swanson has been appointed agronomist in the Research and Technical Dept.

U. S. Rubber Co., Naugatuck Chem. Div. Dr. T. W. Brasfield, former agricultural chemical sales manager, has been named Los Angeles district manager, replacing G. L. Dennis. Otto P. Steinen becomes sales manager for agricultural chemicals.

MURIATE OF POTASH for the PLANT FOOD INDUSTRY

THIS symbol stands for high-grade coarse and uniform Muriate of Potash (60% K_2O minimum). Southwest Potash Corporation provides a dependable supply of HIGH-K* Muriate for the plant food industry.

*Trade Mark

Southwest Potash Corporation

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Associations & Meetings

PNPFA OPPOSES WASH. LAW CHANGES

Proposed amendments to the Washington Fertilizer Law were recently disapproved by the board of directors of the Pacific Northwest Plant Food Association on the grounds that they would not be constitutional and that the resultant effect would be confusing to the industry.

The Dept. of Agriculture at Olympia is said to be dropping the proposal and "has not intended to promote any legislation relative to the expressing of 'Phosphoric Acid' and 'Soluble Potash' as proposed in the Model Fertilizer Bill."

NEW MCA MEMBERS

The Manufacturing Chemists' Association recently announced two new members—The Polymer Corp. Ltd., Sarnia, Ont., Canada, and Dixon Chemical & Research, Inc., Clifton, N. J.

ENTOMOLOGISTS TO MEET IN DES MOINES

Four-hundred Midwestern entomologists are expected to attend the 12th annual meeting of the North Central Branch, Entomological Society of America, March 27–29 at the Hotel Savery, Des Moines, Iowa.

Among the invitational addresses to be given are "What is that Larva?" by Alvah Peterson; "Systemic Insecticides for the Control of Livestock Pests," by R. C. Bushland; "Evolution of Insect Flight," by L. E. Chadwick.

Section meetings will cover forest insects, livestock insects, cereal and forage crop insects, systemics, fruit and truck crop insects and physiology and toxicology.

CHICAGO SITE FOR AMA PACKAGING CONF.

More than 1,000 specialists in packaging, shipping, traffic, management, materials handling and merchandising are expected to attend the American Management Association's 26th annual National Packaging Conference at the Palmer House, Chicago, April 8–10.

CFA SOIL IMPROVEMENT SUBCOMMITTEES NAMED

A comprehensive work program for 1957 was outlined by the Soil Improvement Committee of the California Fertilizer Association at its first meeting of the year in Los Angeles on Jan. 10.

Committee chairman Millard E. McCollam, western manager of American Potash Institute, Inc., has appointed the following working sub-committees and chairmen:

California Fertilizer Conference and Joint Indus- (to page 22)

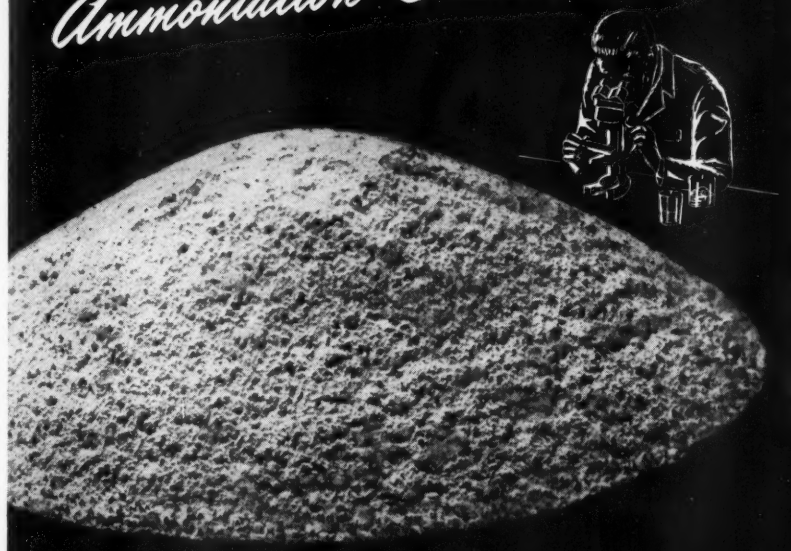
OHIO STUDENT WINS AGRONOMY PRIZE

Winner of the 1956 Agronomy Achievement Award at Ohio State University, Leroy V. Boger (second from left) is congratulated by Dr. W. H. Garman, chief agronomist of the National Plant Food Institute. Presented annually to the most outstanding Ohio State junior student majoring in agronomy, the award is based on scholarship, character and leadership. It carries a cash prize of $200 and an engraved key, presented by the Institute.

C. H. Hutchinson (left), assistant dean of the College of Agriculture at Ohio State, and Dr. Garth W. Volk (right), head of the Agronomy Dept., were on hand to witness the presentation.

C. H. Hutchinson, Award-winner L. V. Boger, Dr. W. H. Garman and Dr. Garth W. Volk.

Fine Texture, Small Particle Size For Maximum Ammoniation-Granulation



RIGID QUALITY CONTROL
Through Six Basic Chemical and Physical Analysis

HIGH WATER SOLUBILITY
High Water Solubility is a Characteristic of all 3 Grades

RUN-OF-PILE
Fine Texture, Highest Porosity, Large Surface Area, Small Particle Size, for Maximum Ammoniation-Granulation

GRANULAR
Dust Free, Free Flowing, Uniform Particle Size, Medium Hardness, No Bridging Over, for Direct Soil Application

COARSE
For Intermediate Ammoniation to Produce a Semi-Granular Product. Also Affords Excellent Compatable Mixing with Granular Potash, for Minimum Segregation, in Alkaline Grades.

TRIPLE SUPERPHOSPHATE

TC TENNESSEE CORPORATION

There's a BRADLEY & BAKER office near you. Their representative would be pleased to consult with you on your requirements and to advise on your most convenient delivery routings.

Fineness of texture and Small Particle size of U. S. Phosphoric Triple Superphosphate affords speedier and more complete agglomeration in your fertilizer processing. Our exacting chemical and physical structure control is your assurance of a Triple Superphosphate that consistently produces maximum ammoniation in a minimum of time, and, our pre-shipping conditioning process delivers to you a product of highest quality and performance ready for immediate inclusion into your processing. Save time, reduce cost and eliminate uncertainties with U. S. Phosphoric Products High Ammoniating Triple Superphosphate.

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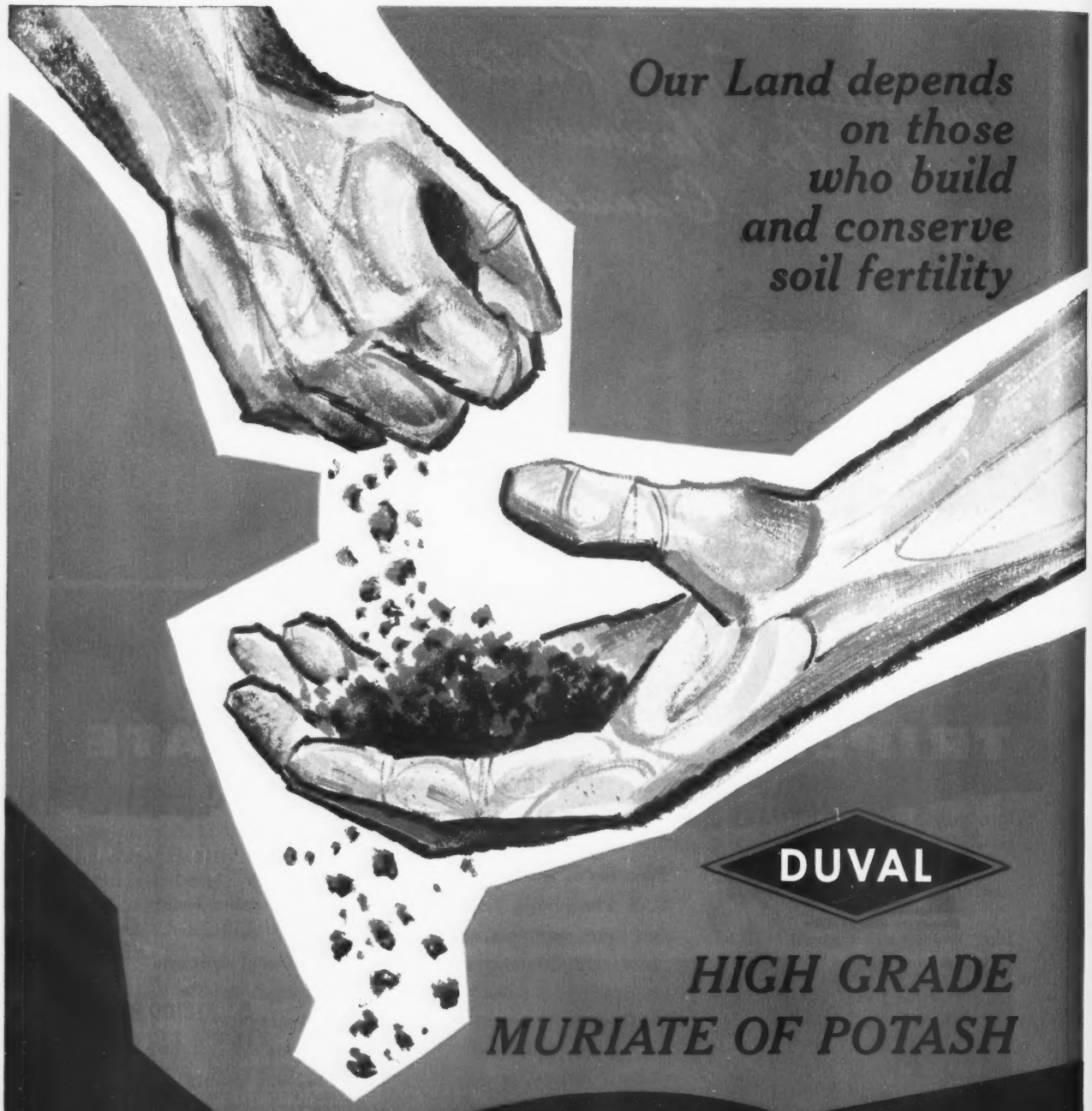

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HIGH GRADE MURIATE OF POTASH

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High Analysis . Unsurpassed Service

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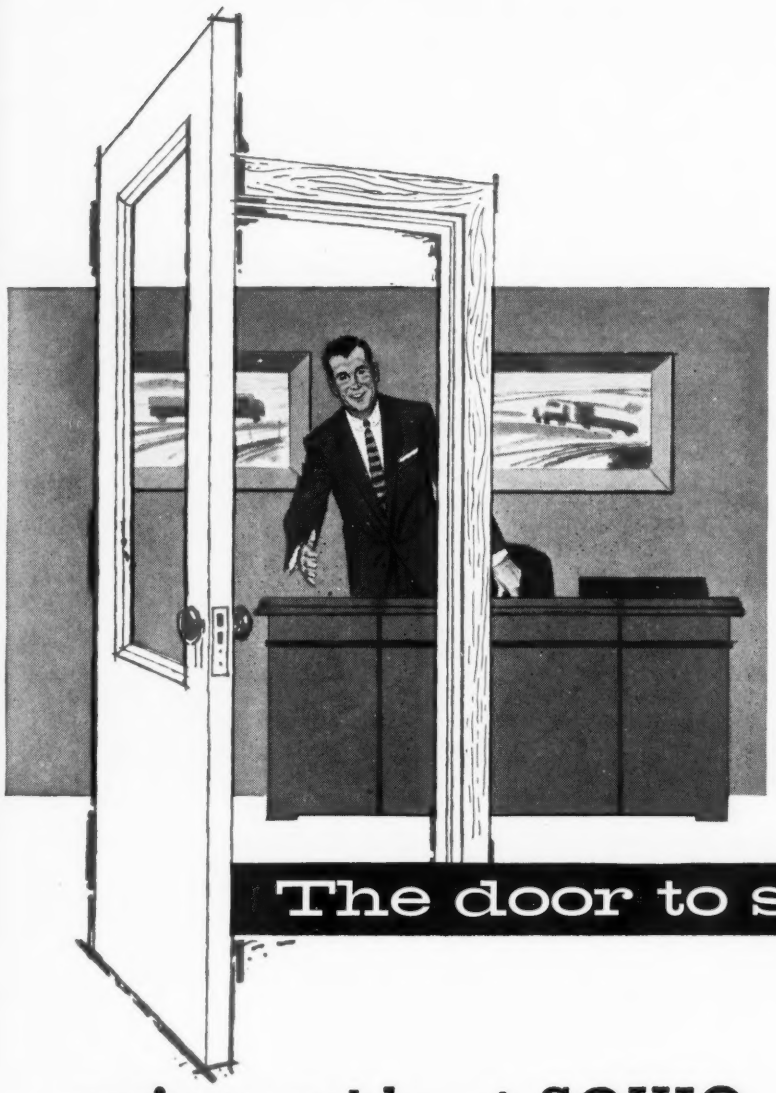

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A complete line of products for fertilizer manufacture

Ammonium Nitrate — Ammonia Solutions

Sohiogen 1, Sohiogen 2, Sohiogen 3, Sohiogen 4 — The standard solutions familiar to the fertilizer industry

Urea — Ammonium Nitrate-Ammonia Solutions

Sohiogen 10, Sohiogen 11, Sohiogen 12, Sohiogen 15 — 41 to 44% nitrogen solutions containing 10 to 15% urea to help mixed goods conditioning

Urea — Ammonia Solutions

Sohiogen 21, Sohiogen 22 — Urea and ammonia in 45% nitrogen solutions, winter and summer grades

Urea — Ammonium Nitrate Solutions

Sohiogen 31, Sohiogen 32 — 28 and 32% nitrogen solution used to add supplemental nitrogen to mixed fertilizers

Urea — Water Solution

Sohiogen 40 — 40% urea solution, liquid source of supplemental nitrogen

Sohio Anyhdrous Ammonia

Sohio Aqua Ammonia

Sohigro Urea

A 46% nitrogen, prilled urea fertilizer material, bagged or bulk supplemental source of nitrogen

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When you need fast, dependable service and accurate technical information from your nitrogen supplier, you can be sure you'll be pleased with the service from Sohio.

Ammoniation a problem? Sohio's technical service staff is always ready to help. They'll be able to offer you unbeatable flexibility in ammoniation — with Sohio's full product line.

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Since dependable delivery is always important, Sohio is prepared to extend you every service — fast delivery from huge storage and loading facilities, speedy truck service, and five rail lines out of Lima.

So if you need nitrogen, call Sohio . . . and get service.

NEW CONCENTRATED SOLUTIONS

Sohio Chemical Company offers a complete line of concentrated type solutions — tailored to fit your particular needs. We invite your inquiries for technical assistance on how these new solutions can offer attractive economies in your operations. You'll save freight and labor. Reduced moisture content lowers drying costs; improves storage quality.

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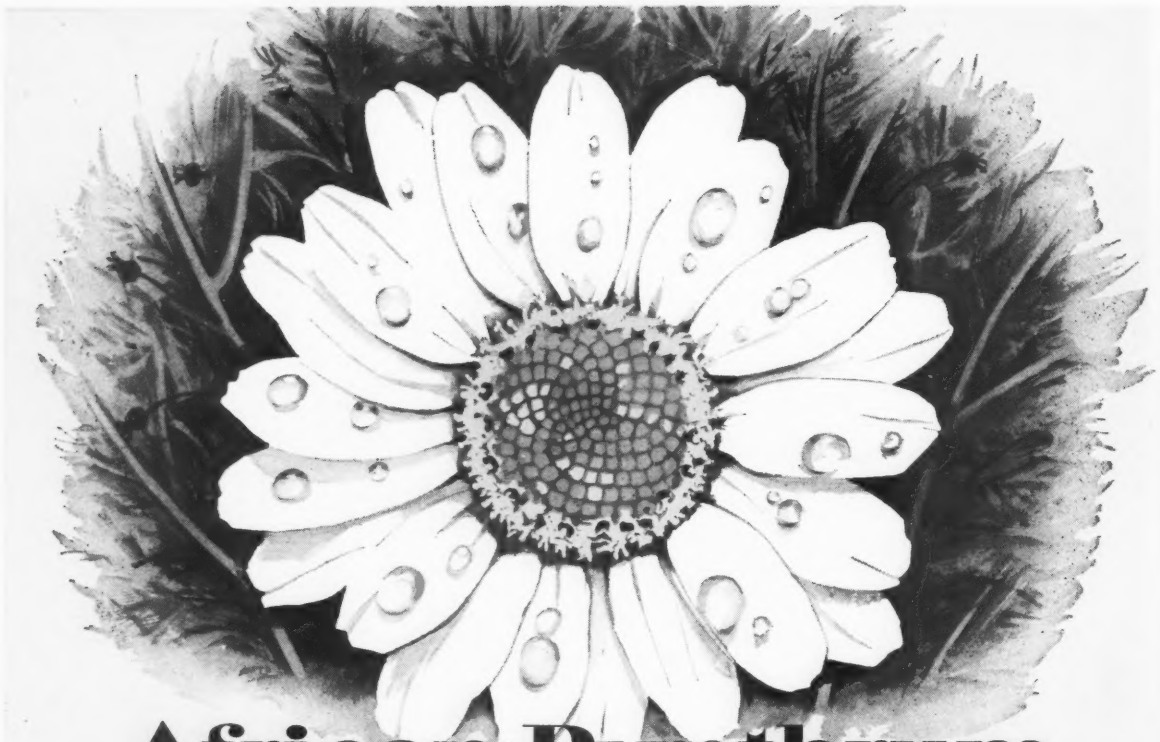

African Pyrethrum

It's a fact Insects are not resistant to Pyrethrum

PYRETHRUM (P.Y.R.), harmless to human and animal life, is

Unsurpassed in Quick Knock-Down

Economy in Concentration With Synergists

Rapid Dispersal High Penetration

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Home Aerosols and Sprays

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Ship's Holds

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Always insist upon Pyrethrum (P.Y.R.) Base Insecticides

"Have you seen Pyrethrum Facts for 1957?"

TO: AFRICAN PYRETHRUM DEVELOPMENT, INC. 7
65 Pine Street, New York 5, N.Y.

Please send me___copies of free booklet, Pyrethrum Facts.

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CITY_____ STATE_____

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AFRICAN PYRETHRUM

FERTILIZER + GRAFLOW T.M.
= A BETTER, MORE FLOWABLE FERTILIZER IN THE FIELD

- Reduces corrosion in mixing and handling equipment!
- Improves fertilizer flowability!
- Speeds cleanup of mixing equipment by minimizing residual buildup!
- Mixes and coats evenly; isolates each fertilizer particle!
- Increases sales of your fertilizer by improving its drillability and reducing caking!
- Cuts wear on both mixing and farming machinery!

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Compare Quality and Prices . . .

THE NEW BAUGHMAN K-5
LIME and FERTILIZER BODIES

MORE RUGGED BODY

- *Reinforced Top Edge*
- *Extended Jacks for full side support*
- *Internal Bracing*

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Each designed for a definite job
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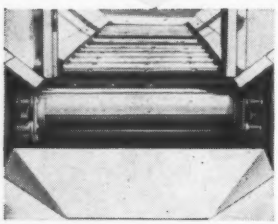
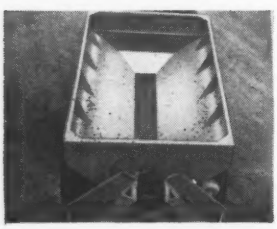
CONVEYORS

DRIVES



DRAG CHAIN CONVEYOR

20" wide. New, heavy duty —having two 20,000 lb. test malleable block chains, welded together with 4" spaced cross drags.



CHAIN BELT CONVEYOR

12" wide. Provides even flow of material to distributor. Links tend to break up small lumps, eliminating endgate plugging. Requires no shields, compartments or chokes. Positive sprocket drive.

BELT CONVEYOR

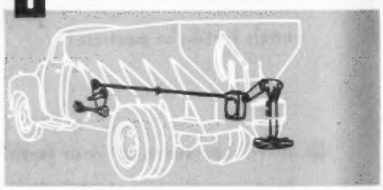
20" wide. Provides smooth even flow of material, even in smallest quantities. Double corrugated drum drives give more belt pull. Needs at least one compartment to ease load on belt. For dry material.

1 Power-take-off driven Distributor and Power-take-off driven Conveyor Drives direct to heavy 44-1 sealed gear case, mounted left or right, and by short #60 chain to distributor case. Has two speeds on conveyor and distributor. (High) for Lime; (Low) for Fertilizer. Has 1-3/16" drive shafts. All bearings sealed against fertilizer.

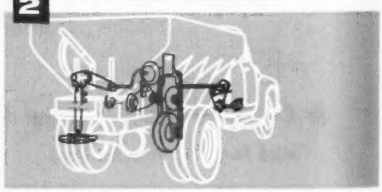
2 Power-take-off driven Distributor and Ground drive Conveyor. Drive can be mounted left or right. Has two speeds. (High) for lime and (Low) for fertilizer. Patented Baughman Ground drive Conveyor gives an even discharge of material in any gear or speed of travel. (Actually Ground Driven.) GC Models have SPREADING CHART showing accurate endgate settings for volume.

3 Hydraulic motor which drives Distributor is powered by hydraulic pump on power-take-off. Baughman Ground drive powers Conveyor.

1 PD-PC DRIVE



2 PD-GC DRIVE



3 HD-GC DRIVE

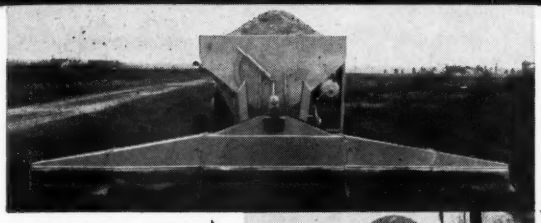
BAUGHMAN
HI-SPEED SPREADING AND CONVEYING EQUIPMENT

BAUGHMAN

The pioneer and largest manufacturer by far of lime and fertilizer spreading equipment.

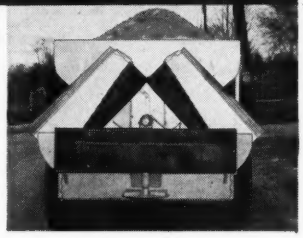
SPREADERS

WE HAVE NO COMPETITION!



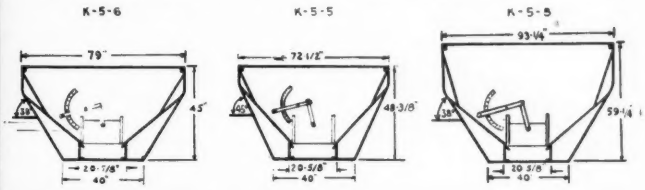
MODEL 235 ATTACHMENT SPREADER

(Optional) Holds material close to the ground. Photo shows open position (less than 8') for highway travel.

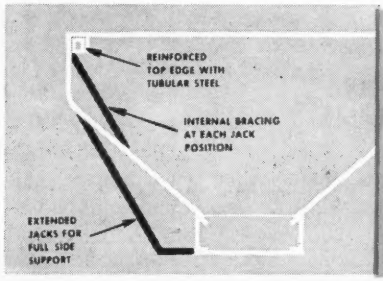


Rugged on top! Durable on the side! The rolled top edges are reinforced with 2" square tubular steel, protecting the body from denting by end loaders and shovels. Welded external jacks provide full-length reinforcement and support of body. Welded internal bracing in same positions provides full load strength under all operating conditions. Strongest body ever built!

Body styles and widths available in Chain Drag and Belt Conveyor Models.



Chain Belt Conveyor Models also available in three sizes with 12⅝" Endgate and 8" narrower body.



STRONGEST SPREADER BODY EVER BUILT!

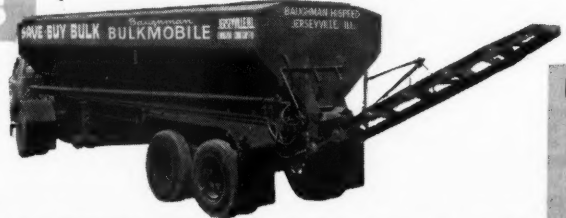
CHECK THESE LOW PRICES!

EXAMPLES

10' MODEL K-5 CHAIN PD-PC Drive —		10' MODEL K-5 CHAIN PD-GC Drive —		10' MODEL K-5 CHAIN HF-GC Drive —	
Power-take-off driven Distributor		Power-take-off driven Distributor		Hydraulic driven Distributor	
Power-take-off driven Conveyor		Ground drive Conveyor		Ground drive Conveyor	
Body Price	$544.50	Body Price	$544.50	Body Price	$544.50
Drives	$302.50	Drives	$605.00	Drives	$1270.50
TOTAL	$847.00*	TOTAL	$1149.50*	TOTAL	$1815.00*
235 Attachment	$223.85		$223.85		$223.85

*Power-Take-Off, Freight, Mounting and Taxes to be added. Prices F.O.B., Jerseyville, Illinois.

Prices on Belt Chain and Belt Conveyors available on request. All models, except chain belt, available with single or double distributor.



Heavy Duty BULKMOBILE. Huge Capacity (740 Cu. Ft. Cap. shown here). Full hydraulic or gas engine operation with hydraulic conveyor. Ideal as "parent" body for feeding spreaders in the field. All sizes.

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Manufacturing Co., Inc. JERSEYVILLE ILLINOIS

You'll see more Baughmans on the highway than all other makes!

(from page 14) try-University Meetings—J. H. Nelson, Stockton, chairman.

Vocational Agriculture—Forrest Fullmer, Newport Beach.

Western Fertilizer Handbook—Earle J. Shaw, Los Angeles.

Research Grants and Special Funds for the University—Russell White, San Francisco.

Securing an Agronomist for the Committee Staff—Dr. Malcolm McVickar, Richmond.

Audio-Visual Selling Aids—R. L. Luckhardt, Los Angeles.

Workshop R. L. Luckhardt.

Fertilizer Guarantee Changes—Douglas Jamison, Spokane.

WACA PLANS SPRING MEETING PROGRAM

Program of the Western Agricultural Chemicals Association spring meeting on April 2 at Los Angeles will feature the presentation of T. A. Loomis, M.D., toxicologist, Washington state, on "Effects of Anticholinesterase Insecticides on the Human."

Ned Lewis, vice president of Wilbur-Ellis Co., will tell of "Some Economic Aspects of the Pesticides Industry" and an industry scientist will discuss the outlook for improved pesticides.

CALIF. FERTILIZER CONF. AT FRESNO STATE

Site for the fifth annual California Fertilizer Conference, sponsored by the Soil Improvement Committee, California Fertilizer Association, will be the campus of Fresno State College. J. H. Nelson and Earl R. Mog, both of Stockton, are co-chairmen for the meeting which will be held on April 14 and 15.

The Fertilizer Committee of the University of California will be guests of the Soil Improvement Committee at an annual joint dinner to be held at the Hacienda on Sunday evening, April 14.

The conference program will feature reports of fertilizer research and panel discussions on potash responses and minor element deficiencies.

PYLE ADDRESSES TEX. AG AVIATION CONF.

Administrator James T. Pyle of the Civil Aeronautics Administration appeared on the program for the sixth annual Texas Agricultural Aviation Conference and Short Course on Pest Control at Texas A&M, Feb. 24–26. Pyle discussed "General Aviation in the National Picture" during the conference banquet on Feb. 25.

On the agenda for the conference was a symposium on insect control, "A Rancher's Viewpoint on Brush Control" from H. Macon Boddy of Henrietta, "Agricultural Aviation in Europe" by Fred Weick, flying demonstrations and exhibitions of various aircraft used for agricultural purposes.

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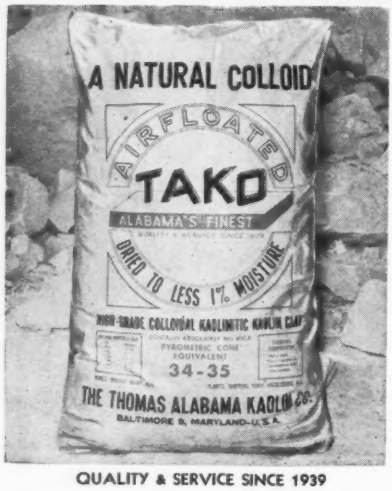

QUALITY & SERVICE SINCE 1939

"TAKO" Natural High Grade Pure Colloidal Kaolinitic Kaolin Crude from our very extensive deposits is processed by neither adding to nor taking away any of its very desirable properties. Its colloidal properties give increased workability in formulations and its purity is highly desirable due to its compatibility with chemicals.

"TAKO" Airfloated Colloidal Kaolinitic Kaolin is a natural exclusive product—a practically pure inert colloid with exceptional qualities—contains absolutely no mica—practically chemically pure.

"TAKO" Excellent adhesive-absorption qualities—excels in formulations of insecticides-pesticides—inert colloidal properties increase toxic action—give increased workability—dispersion—free flowing from all types of dusting equipment—absolute minimum drifting.

	MICRON SIZE		
NO MICA	MINUS 1 MICRON	55%	GUARANTEED
	" 2 "	68%	LESS
NO ALKALIES	" 5 "	85%	1% FREE MOISTURE

AIRFLOATED—BAGGED OR BULK

DEPENDABLE PROMPT SERVICE

Non-Abrasive • Non-hygroscopic • Non-caking • Free-flowing

"TAKO" is produced under complete laboratory control. Large tonnage used by the insecticide-pesticide, fertilizer, chemical, & other large industries.

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INVESTIGATE "TAKO" FOR YOUR REQUIREMENTS

MCA AWARDS TO TOP CHEMISTRY TEACHERS

Six medals and awards will be presented this coming June by the Manufacturing Chemists' Association for outstanding teaching of chemistry at the undergraduate level in American colleges and universities.

MCA reported that cash awards of $1,000 each as well as medals and citations will be granted to winners chosen on a nationwide basis.

CHEM. PROGRESS WEEK SET FOR APRIL 8-12

The fourth annual Chemical Progress Week, sponsored by the Manufacturing Chemists' Association, has been scheduled for April 8–12, 1957.

During this year's celebration the importance of interesting more young men and women in careers in science will again be stressed. In addition, MCA plans to explain the importance of industrial research.

FIRST KANS. PESTICIDE APPL., DEALER CONF.

The first Kansas Pesticide Dealer and Custom Applicator Conference was held at Kansas State College on Feb. 26, according to Chris C. Burkhardt of the Entomology Dept., general chairman for the conference.

Sponsors of the meeting were the K-State departments of entomology, agronomy, agricultural engineering, botany and plant pathology, the extension service, and the agricultural research service, USDA.

DISCUSS WEATHER'S EFFECT ON COTTON PRODUCTION

A better understanding of the effects of weather conditions on all phases of cotton production was the aim of workshops held Feb. 20–21 at the Delta Branch Experiment Station, Stoneville, Miss., reports National Cotton Council.

The program was opened with a full description of all phases of cotton production by Dr. W. L. Giles, superintendent of the experiment station. Staff members of the station then told of effects of weather on many phases of production, including obtaining stands, weed control, irrigation, insect control, defoliation and harvesting.

During afternoon sessions, procedures and techniques in making public service forecasts were discussed, as well as the types of forecasts and their dissemination and the future of forecasting and climatology.

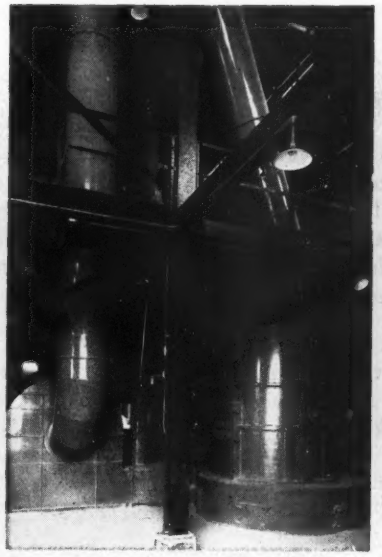
General conference chairman was Claude L. Welch, director of the production and marketing division of the National Cotton Council.

superior grinding equipment since 1891

BRADLEY PNEUMATIC HERCULES MILL

Provides a uniform grind from 20 to 325 mesh. Floor level installation provides easy accessibility . . . lowest installation and maintenance costs. Durable, non-clogging vibratory feeder for dependable, worry-free operation . . . even on material with some amount of moisture.

for Fine grinding of limestone phosphate rocks, etc.



for Semi-fine grinding of agricultural limestone

BRADLEY HERCULES MILL

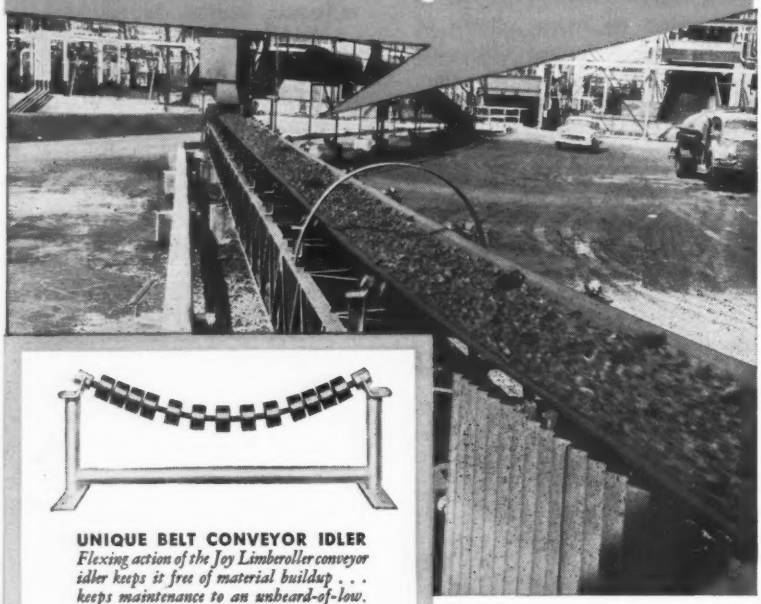
From rough to finish in one low-cost operation. Automatic electric feed control eliminates manual operation. Rugged, dustless construction, maximum accessibility, keep maintenance costs at an absolute minimum. In sizes to meet any requirements at moderate cost.

For complete information, write for catalogs No 61-62

Bradley PULVERIZER CO.

LONDON ALLENTOWN, PENNA. BOSTON

Handle Sticky Materials Without Buildup on Rolls!



UNIQUE BELT CONVEYOR IDLER
Flexing action of the Joy Limberoller conveyor idler keeps it free of material buildup . . . keeps maintenance to an unheard-of-low.

Belt conveyor maintenance can be a real headache when sticky chemicals and fertilizers start gumming up the idlers. The unique Limberoller belt conveyor idler is completely flexible—made of resilient molded neoprene discs on a flexible steel cable. This flexing action breaks loose any material building up on the rolls—makes maintenance dive 30% to 90%.

The Limberoller has already given over *12 times the service life* of conventional idlers in many applications—proved extremely effective in handling triple superphosphate, ammonium sulphate, and sticky fertilizers.

The Joy Limberoller also resists dust, abrasion, and corrosion . . . no bearing trouble because only two bearings are used and these are up out of the dirt zone. Get details from *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.* In Canada: *Joy Manufacturing Co. (Canada) Limited, Galt, Ontario.*

Write for FREE Bulletin 131-77

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For Air and Gas Compressors, Vacuum Pumps and Boosters, Conveyors, Fans, Electrical Connectors, Oil-Free Compressors.

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JOY

SINCE 1851 . . . OVER 100 YEARS OF ENGINEERING LEADERSHIP

Calendar

March 5-6. Western Cotton Prod. Conf., Westward Ho Hotel, Phoenix, Ariz.

March 6-8. NAC Assn. Spring Meeting, Fairmont Hotel, San Francisco.

March 11-12. S. W. Branch, Entomological Society, Gunter Hotel, San Antonio, Tex.

March 12-13. Chemical Market Research Assn., Sheraton Hotel, Philadelphia.

March 13-15. New Jersey Mosquito Extermination Assn. Annual Meeting, Haddon Hall, Atlantic City.

March 19-20. 21st Meeting, Georgia Entomological Society, Rock Eagle 4-H Camp, Eatonton, Ga.

March 26-28. Council for Agri. and Chemurgic Research, Congress Hotel, Chicago, Illinois.

March 27-29. North Central Branch, Ent. Society of America annual meeting, Des Moines, Iowa.

April 2. Western Agri. Chem. Assn., Hotel Biltmore, Los Angeles, Calif.

April 8-12. Chemical Progress Week.

April 14-15. Fifth annual Calif. Fertilizer Conf., sponsored by the Soil Improvement Committee, Calif. Fert. Assn., Fresno State College, Fresno.

May 20-22. Chemical Specialties Manufacturers Association, Mid-Year Meet. Drake Hotel, Chicago.

June 9-12. National Plant Food Institute, annual meet. Greenbrier Hotel, White Sulphur Springs, W. Va.

June 6-8. Manufacturing Chemists' Association Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

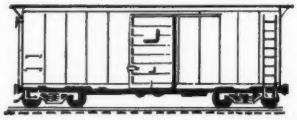
June 17-19. 15th Convention, Assn. of Southern Feed and Fert. Control Officials, Dinkler-Tutwiler Hotel, Birmingham, Ala.

June 23-26. American Society of Agr. Engineers Annual Meeting, Mich. State Univ., East Lansing.

June 26-28. Eighth Annual Fert. Conf. of Pacific N. W., Benson Hotel, Portland, Ore.

July 10-14. Plant Food Producers of Eastern Canada Convention, Manoir Richelieu, Murray Bay, Que.

July 17-19. Southwestern Fert. Conf. and Grade Hearing, Galvaz Hotel, Galveston, Tex.



TRIPLE SUPERPHOSPHATE

Phillips 66 Triple Superphosphate contains 46% available phosphoric acid. It has the physical properties essential for maximum ammoniation efficiency.

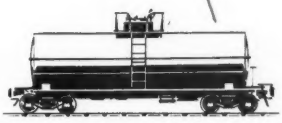
AMMONIUM NITRATE

New, improved quality Phillips 66 Prilled Ammonium Nitrate contains 33.5% nitrogen. The small, coated prills resist caking, handle easily. Depend on Phillips 66 Prilled Ammonium Nitrate for top-notch crop response as a direct application material. It's an ideal companion high nitrogen fertilizer for your quality mixed goods.

5

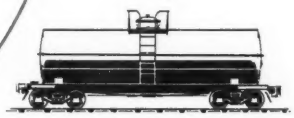
PHILLIPS

Materials for the Production of Premium Fertilizers



NITROGEN SOLUTIONS

Get more N per dollar! There are six Phillips 66 Nitrogen solutions for use in preparation of high-analysis fertilizers and the ammoniation of phosphate materials. Use these solutions to help keep manufacturing costs low; help rapid, thorough curing.



ANHYDROUS AMMONIA

Phillips 66 Agricultural Ammonia containing 82% nitrogen is a convenient, economical source of nitrogen for the formulation of mixed fertilizers. Immediate tank car shipments are assured through Phillips production facilities in the Texas Panhandle and at Adams Terminal near Houston. Phillips also has tank car pools at many key points.

AMMONIUM SULFATE

New premium quality Phillips 66 Ammonium Sulfate contains 21% nitrogen, 23.8% sulfur. It is *dry*-cured to remove excess moisture, prevent caking. Uniform dust-free crystals flow freely, mix easily. Ideal for all analyses of mixed goods and for direct application. Available in bags or bulk.

PHILLIPS CHEMICAL COMPANY

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DENVER, COLO.—*1375 Kearney Ave.*
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TAMPA, FLA.—*3737 Neptune St.*
TULSA, OKLA.—*1708 Utica Square*
WICHITA, KAN.—*501 KFH Building*

$242 MILLION PAID IN AR PART OF SOIL BANK

Payments to farmers participating in the 1956 Acreage Reserve program of the Soil Bank totaled $242,524,096.91 in 45 states and Puerto Rico reporting through Dec. 31, according to USDA.

USDA indicated that the maximum amount of payments farmers could earn by remaining in compliance with the program was nearly $261,000,000. However, the department later authorized termination or modification of 1956 Acreage Reserve agreements by farmers who misunderstood terms of the program. Consequently, total amount to be disbursed under the 1956 program is expected to be somewhat under that figure.

ICA AUTHORIZATIONS

Guatemala. $75,000—mixed fertilizers (PIO/C No. 20-19-909-6-70050, Code 2354). Contract period: Feb. 18 to April 14. Source: World wide. Terminal delivery date: April 30.

Procurement will be carried out through Agriculture Servicio, Guatemala City, Guatemala.

RESEARCH ADVISORS RECOMMENDATIONS

A research program calling for studies to help meet the critical problems of soil and water in the U. S. was urged by the Soils, Water and Fertilizer Research Advisory Committee, a 10-member group named to advise USDA in this field.

Among lines of work recommended were expanded participation by USDA in an effort to facilitate control of fertilizer quality and initiation of research on potassium fertilizers of low solubility.

Dr. Russell Coleman, executive vice president of the National Plant Food Institute, was one of the members of the advisory group.

TVA ONE-STEP PROCESS FOR TRIPLE SUPER

TVA has under development a new one-step process for making granular triple-superphosphate. The granular product is made in the TVA-developed ammoniator-granulator pilot plant which acts in this case as an acidulating drum.

According to Charles H. Young, manager of chemical engineering for TVA, the shot-size or granular material does not cake in bags.

"TVA investigators found in pilot-plant work that when phosphate rock and phosphoric acid—raw materials for triple-superphosphate—are mixed in a rotating drum, the rolling action of the drum forms the material into pellets or granules," Young said. "The product is dry enough to go directly to storage, where it remains for about a week to allow completion of the reactions.

"Some advantages of the process are low equipment costs, no drying equipment and a product that can be ammoniated and mixed like non-granular superphosphate. The process should prove useful not only to basic producers of superphosphate, but also to the many manufacturers of mixed fertilizers who have the ammoniator-granulator in their plants. The fertilizer manufacturer can make his own superphosphate and then use the same equipment for producing his mixed fertilizer."

Young added that studies are under way for adapting the process to the production of normal and enriched superphosphates.

DISCUSS INSECT AND DISEASE PROBLEMS

Agricultural workers throughout the country had an opportunity during February to discuss major regional insect and plant-disease problems, with emphasis on pests of foreign origin, USDA has announced.

USDA's Agricultural Research Service sponsored meetings in each of the four National Plant Board Regions—at Rutgers University, New Brunswick, N. J., Feb. 6–8; University of Calif., Berkeley, Feb. 13–15; Univ. of Minnesota, St. Paul, Feb. 18–20 and Mississippi State College, State College, Miss., Feb. 25–27.

Four major weapons wielded by Federal and state personnel against plant pests were scheduled for discussion:

1. Federal-state quarantines against importation and movement of insect- or disease-carrying products.

2. Plant-pest surveys, an increasingly efficient method for detecting first signs of an insect or plant disease new to a region or country.

3. Research to help provide tools for control and eradication of pests that are now a problem and to keep ahead of possible future problems.

4. Federal-state programs for control and eradication of plant disease and insect pests.

Ways of interesting and training more young people for pest control and related research agencies is another of the problems which was to be discussed.

Take a good look at your multiwall bag!

Like women's bathing suits, multiwall bags also reveal the passing of time.

Is your bag a vivid, modern example of your business vitality . . . or is it dull, drab and lacking in appeal?

Is your bag the ideal package for your product, in size and construction, or is it a carry-over from the past?

To compete successfully in your markets, your package should be as up-to-date as this issue of the magazine . . . *if it isn't*, it's a good idea to send for us.

KRAFT BAG CORPORATION

Gilman Paper Company Subsidiary

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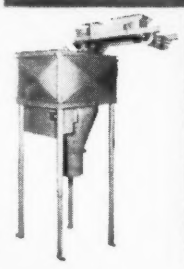
Dependable as a service for 3 generations



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KRAFTPACKER
will handle practically any free-flowing material—faster—and with more accuracy, than any open mouth bag filling machine of its type in use today—regardless of price!

☐ We are interested in improving our bag.

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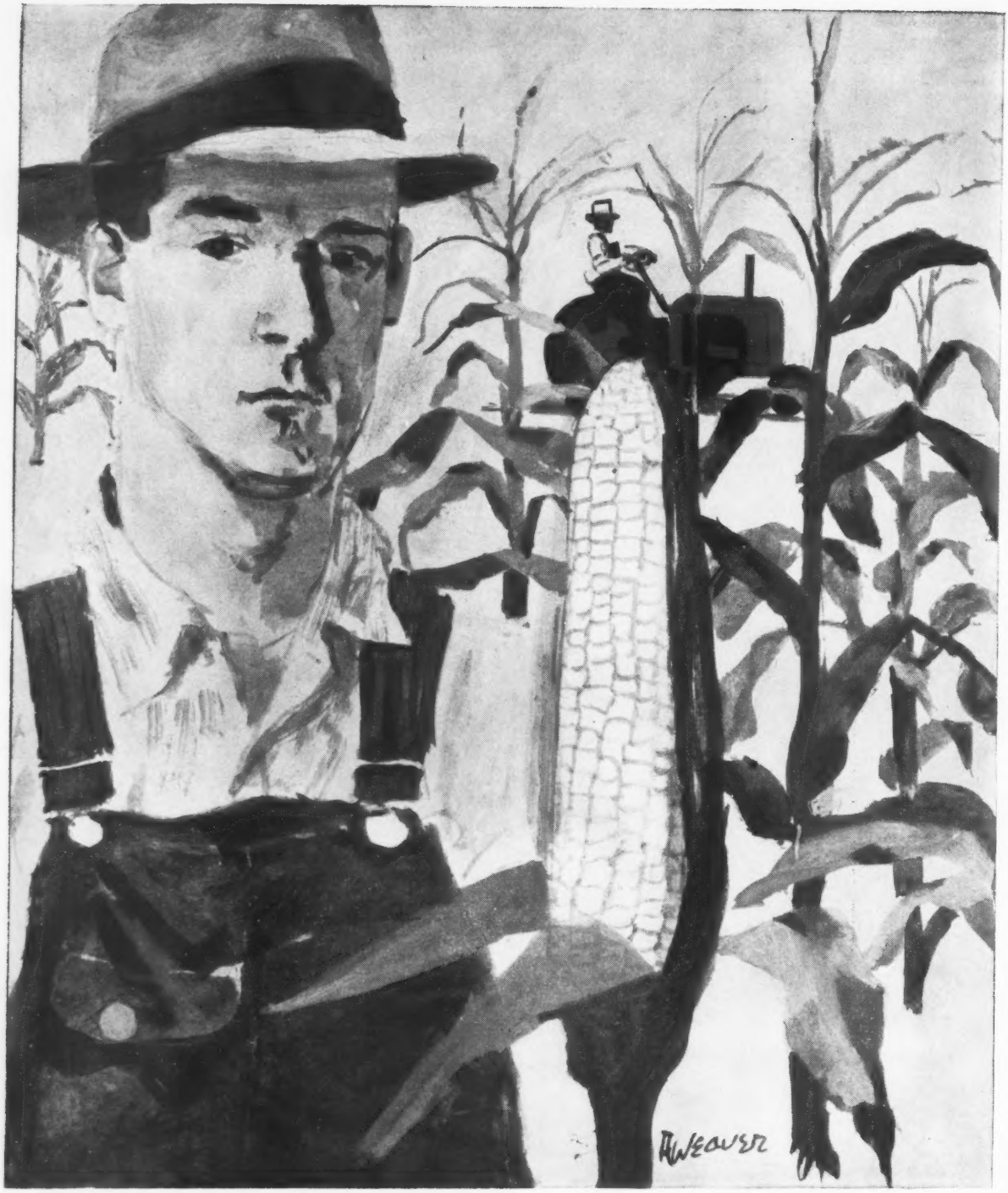

POTASH RAISES FARM INCOME. The successful American corn farmer. He talks rotations and experimental stations. He talks potash, too. It's not all talk, either, because every September he comes up with the best harvest around. So it must be true, what he says about using potash-enriched fertilizers in his soil—that they fight diseases and help increase his yield. He works no harder than the next farmer. The prices he gets are a little fancier, that's all.

USP's Higrade muriate of potash is free-flowing and non-caking and has the highest K_2O content—62/63% K_2O. Also available, USP's Granular muriate of potash contains a minimum of 60% K_2O.

UNITED STATES POTASH COMPANY
DIVISION OF UNITED STATES BORAX & CHEMICAL CORPORATION
30 Rockefeller Plaza, New York 20, New York. Southern Sales Office: Rhodes-Haverty Building, Atlanta, Georgia.

SUNSHINE STATE POTASH A PRODUCT OF NEW MEXICO U.S.A.
REG. U. S. PAT. OFF.

VIEWING WASHINGTON

with Farm Chemicals Washington Bureau

on agriculture

Soil Bank changes, of significance to the fertilizer and chemicals industry, definitely are in the wind. Democrats are pushing for a change which would open the door of the higher paying acreage reserve of the Soil Bank to practically all farmers. Many Republicans are inclined to the same approach. But the Administration is expected to hold the line for this year at least. Thus, big changes may finally be postponed until next year--but Washington observers believe they are ahead.

The change sponsored by House Democrats would, in brief, pay all farmers a flat $15 an acre to put at least 15 per cent of any feed grain or oilseed cropland into the acreage reserve--which is designed to pay farmers to reduce surplus plantings. This would apply to oats, barley, rye, grain sorghums, soybeans, flaxseed, and corn and wheat not under allotments.

A second change would boost the 1957 corn acreage allotment to 43.2 million acres from the announced 37.3 million. Corn growers could get price support by planting within the higher figure. Additionally, producers of the five basic commodities, corn, wheat, cotton, tobacco and rice, could put up to 18 per cent of any feed grain land into the acreage reserve and get paid 90 cents a bushel on normal yield on that land.

Impact of this proposed program becomes clear when you consider that between 15 and 20 million acres of feed grains and oilseeds possibly would be taken out of production--over and above the 20 million acres sought by the Administration from corn, wheat, cotton, tobacco and rice land.

Pesticide sales may gain, but fertilizer sales may lose under such a program. Greater farmer concentration on fewer acres, may conceivably encourage a new emphasis on protection of remaining crops with all kinds of pesticides. On the other hand, there is little reason to suppose that stepped-up use of plant foods on remaining acres would be enough to off-set a probable fertilizer consumption cut brought about by the big crop reduction.

Without major Soil Bank changes, crop production this year again is expected to be at record levels. Watch for the Agriculture Department's planting intentions report due March 18 for first solid tip-off on planting prospects. One of the chief reasons officials expect near-record production again is that the general level of farm price supports has been reduced this year. This, they say, will encourage growers to produce more per acre.

VIEWING WASHINGTON

on business

Tax change with the best chance this year appears to be repeal, or at least an easing, of the 3 per cent excise on transportation of property--including fertilizer and pesticides. Despite Administration opposition to tax reductions which would result in substantial revenue loss--pressure is building up fast in Congress for this concession.

This tax was imposed during World War II as part of an overall tax adjustment to help defray wartime Federal expenses. Advocates of repeal, which include business, labor and agricultural interests, maintain the emergency for the levy has long since passed.

Most likely approach by Congress, in view of the Treasury's attitude, is for a gradual reduction. Dropping the rate to 2 per cent this year would mean a loss of revenue to the government of about $115 million, while a complete end to the 3 per cent levy would cut the "take" about a half billion dollars.

National Plant Food Institute may be planning a vast expansion program to spur sales for the industry, according to indications in Washington.

Straw in the wind: NPFI's Board of Directors has ordered a broad intensified educational and research program on fertilizer use. It also has authorized a professional consumer survey on factors which influence proper fertilizer use.

Fertilizer consumption during the year ending June 30, 1956 declined 2.8 per cent, according to preliminary Agriculture Department figures. Estimated consumption was 22,096,000 short tons, down 628,000 tons from the previous year. Consumption decreases showed up in seven of the nine regions of the U. S. and territories, with slight gains reported in the West South Central and Pacific regions.

Total consumption of primary nutrients is estimated at 6,081,000 tons, compared with 6,120,000 tons the previous year. Experts predict that average nutrient content of a ton of fertilizer in 1955-56 will be 29 per cent, compared with 27.9 per cent in 1954-55. The breakdown of primary plant nutrients consumed: Nitrogen, 1,952,000 tons; available P_2O_5, 2,240,000 tons; and K_2O, 1,889,000 tons.

Chemical company mergers went up slightly, from 52 in 1955 to 55 in 1956--while mergers in other manufacturing and mining industries together declined from 689 to 638. Mergers in other businesses, however, went up a thumping 60 per cent during the period. Federal regulatory agencies, meanwhile, are stepping up their actions against monopolistic mergers.

THE MAN WITH THE MULTIWALL PLAN

UNION PACKAGING SPECIALIST J. R. GARMON

takes 40,000 lbs. off a packer's shoulders

Lifting twenty tons of filled bags a day is a lot of labor. It's inefficient, too, as a large chemicals producer learned during a recent survey of his Multiwall operation made by Union Packaging Specialist J. R. Garmon.

Garmon suggested a new system of *sliding* the customer's bags from the check-weigh scale to the bag flattener. This would not only relieve packer fatigue of manually lifting a 40,000 lb. bag load each day, but also assure full-capacity, full-time operation of the bagging equipment.

Union Multiwall Recommendations are based on this 5-star Packaging Efficiency Plan

- DESIGN
- EQUIPMENT
- CONSTRUCTION
- SPECIFICATION CONTROL
- PLANT SURVEY

Another recommended economy tip: redesign style, proportion, and construction of existing multiwall bags. This will result in annual savings of $1400 to $8000 for each 450 M of the various size bags used.

Such savings are not unusual when Union's 5-Star Packaging Efficiency Plan goes to work for a company. Write for complete information about this Plan. It costs nothing. There is no obligation.

Better Multiwall performance through better planning

union camp

UNION'S PACKAGE ENGINEERING DEPARTMENT will study your Multiwall bagging methods and equipment and make appropriate recommendations, regardless of the brand of Multiwalls you are now using.

UNION MULTIWALL BAGS

UNION BAG-CAMP PAPER CORPORATION

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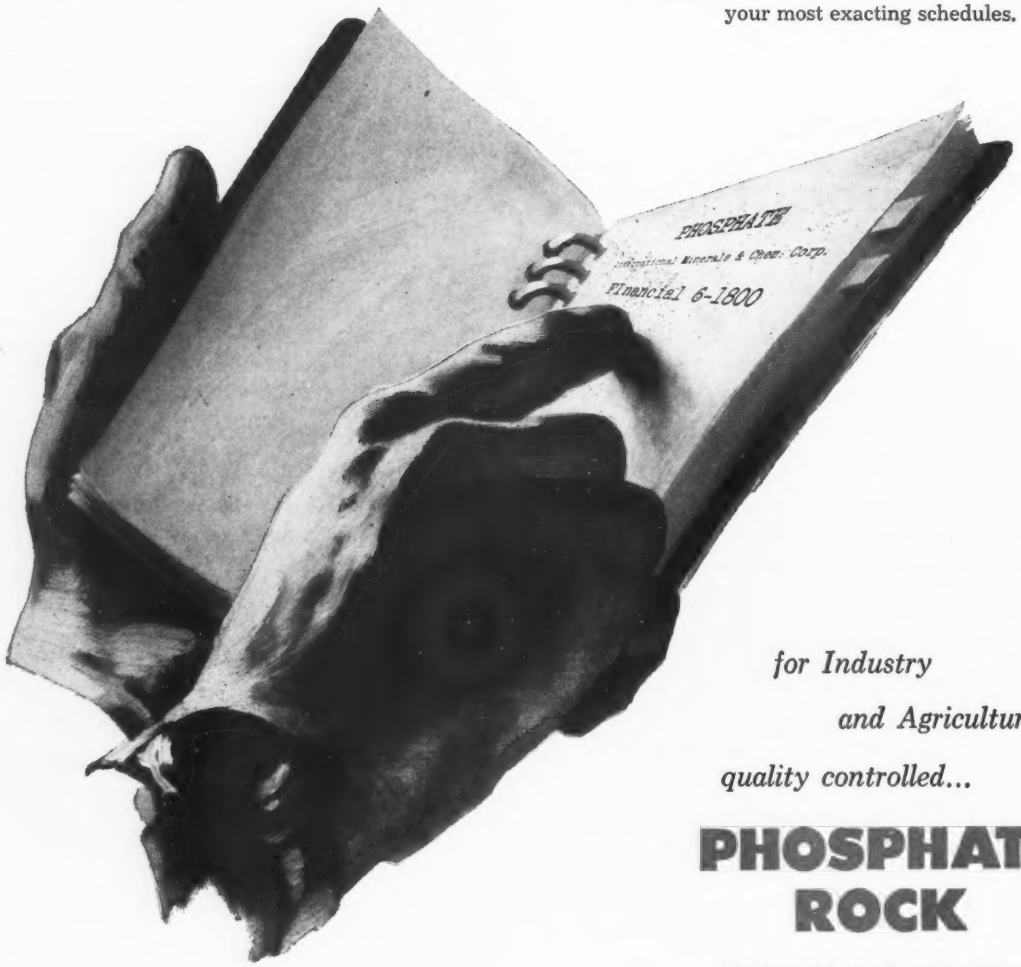
WHEN YOU'VE GOT TO GET IT FAST

DIAL INTERNATIONAL

Need more phosphate in a hurry? Call *International.* You'll get it fast! That's one reason so many plants depend on *International*—for here are the resources and facilities to give you extra-special service as a matter of simple routine. This service is yours to command, yours to depend on because of *International's* huge production and enormous storage capacity at mines and plants in Florida and Tennessee. You have available a full range of grades of quality-controlled phosphates and a traffic service that will meet your most exacting schedules.



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quality controlled...

PHOSPHATE ROCK

★ for the manufacture of complete fertilizers
★ for the manufacture of industrial chemicals
★ ground rock phosphate for direct application to the soil

PHOSPHATE MINERALS DIVISION

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PHOSPHATE MINES AND PLANTS IN FLORIDA AT NORALYN, PEACE VALLEY, ACHAN, MULBERRY; IN TENNESSEE AT MT. PLEASANT, WALES AND GODWIN

Arcadian® News

Volume 2 | For Manufacturers of Mixed Fertilizers | Number 3

DOES HE BUY ALL HIS FERTILIZER FROM YOU?

Complete Fertilizer Service Builds Exclusive Customers

Every fertilizer manufacturer wants plenty of exclusive customers. One way to build customer loyalty is to study trends and be a step ahead by anticipating and supplying your customers' total plant food needs.

Two important trends are evident in 1955-56 fertilizer consumption figures: **1)** The growth of the use of high-nitrogen fertilizers during a year when total mixed fertilizers remained stable. **2)** The fact that more nitrogen is sold as straight materials than in mixed fertilizers.

Mixed fertilizers used in 1955-56 contained 815,000 tons of nitrogen, while straight materials accounted for 1,137,000 tons. This is in contrast with 1,789,000 tons of phosphoric acid and 1,671,000 tons of potash in mixed goods versus 457,000 tons of phosphoric acid and 218,000 tons of potash as straight materials.

Get More of the Market

The longer our soils are farmed, the greater the need for nitrogen along with phosphorus and potash. Experiment Stations are recommending better-balanced fertilizers. Corn and several other major crops require more nitrogen than any other plant food.

You get a bigger share of the fertilizer market when you are prepared to provide all of the mixed-goods analyses and straight materials your customers want.

When farmers buy low-nitrogen mixed fertilizer, more and more of them are supplementing this with direct-application nitrogen materials. Sell straight nitrogen materials along with your mixed goods and you build your volume as well as your leadership among farmers as a dependable, one-stop source of supply. Few farmers can get the crop profits they want by using straight nitrogen alone, any more than they can by using low-nitrogen fertilizers alone.

Nitrogen Division is prepared to assist you in enabling you to offer your customers a complete line. Many different ARCADIAN Nitrogen Solutions are available for the manufacture of every fertilizer analysis now in demand. Nitrogen Division is also the only source of all kinds of straight nitrogen materials, both solid and liquid, for direct application.

Start now to make nitrogen a sales-builder for you. Contact Nitrogen Division, Allied Chemical & Dye Corporation, 40 Rector Street, New York 6, N.Y.

CORN IS A BIG TONNAGE MARKET FOR FERTILIZER

For the U. S. as a whole, more fertilizer is used on corn than on the next four crops combined. The use of fertilizer on corn has been increasing at a rapid rate. 60% of all corn planted was fertilized in 1954, as compared to 48% in 1948. Corn that was fertilized got 38 pounds of fertilizer per acre in 1938...103 pounds per acre in 1948...and 259 pounds per acre in 1954.

Despite acreage limitations, the market for corn fertilizer is a big opportunity. Nearly 40% of the crop still gets no fertilizer. Almost half the crop gets no fertilizer at planting...less than one-third gets plow-down fertilizer...and the side-dressing market is mostly undeveloped except in the Southeast.

An All-State Market

Corn is a fertilizer market in every state. New hybrids have extended the growth of corn further north and south and at higher and lower altitudes. Even California, which grew little corn a few years ago, keeps expanding its acreage. The only crops which compare with corn as a fertilizer market, in limited areas, are cotton, wheat, oats, tobacco, fruits and vegetables, potatoes, rice, barley and sugar beets. But, corn is the universal market.

Figure Your Potential

If 5,000 acres of corn are grown within a 5-mile radius of the average fertilizer dealer and farmers are using the average amount of fertilizer per acre, he can sell his share of the 388-ton market. And he has a big opportunity to increase his sales of corn fertilizer. If, like tobacco growers, corn growers used fertilizer on 98.5% of their acreage, the market would jump to 637 tons. Some farmers use 500 to 800 pounds of fertilizer per acre of corn. Get the average up to 400 pounds per acre and the market in a 5-mile radius needs an additional 347 tons per year.

A recent survey of Indiana and Illinois corn growers showed that 422 of 445 used some fertilizer on corn. Only 254 of these farmers used fertilizer on oats, 242 on wheat, and 120 on legumes or pasture. Corn offers a quick and lucrative return from time spent selling fertilizer. It's a big tonnage market!

Again we tell $3\frac{1}{2}$ Million Farmers *Fertilizer Grows Farm Profits*

Nitrogen Division has received many compliments on its powerful and continuing campaign to educate farmers on the importance of fertilizers under present conditions. The advertisement on the opposite page is the ninth in a series of full-page advertisements directed to the attention of millions of readers of farm magazines and designed to support the entire fertilizer industry. Others will follow. We trust that this campaign is helpful in increasing your sales. Comments and suggestions will be appreciated. Write Nitrogen Division, Allied Chemical & Dye Corporation, 40 Rector Street, New York 6, N.Y.

The bank that pays BIG profits on deposits

Your withdrawals depend on your deposits whether you are putting money in your bank or plant foods in your soil. But, you get a much bigger return from the plant foods you put in your soil than you do from the money you put in your bank.

For example, 100 bushels of corn withdraws from your soil only about $28 worth of nitrogen, phosphoric acid, potash, calcium, magnesium and sulphur. And, 80 bushels of oats takes out about $20 worth of plant foods.

The plant foods you deposit in your soil in commercial fertilizers pay you big returns in extra yields of profitable crops. It's good business to be as careful about keeping your soil account in balance as you are about keeping your bank account in balance.

When you figure that $1 invested in fertilizer deposited in your soil enables you to withdraw $3 to $4 in extra yields, it's easy to see that fertilizer is your best-paying investment.

Make sure you use enough of the right fertilizer for each crop this year. Test your soil. Figure out how much of each plant food your soil needs to produce the yields you want. Get the advice of your county agent and your fertilizer dealer.

NITROGEN DIVISION ALLIED CHEMICAL

***The fertilizer industry** serves the farmer. Nitrogen Division serves the fertilizer industry as America's leading supplier of nitrogen, the growth element in mixed fertilizers. Nitrogen Division, Allied Chemical & Dye Corporation, 40 Rector Street, New York 6, N. Y.*

Fertilizer GROWS Farm Profits

WISCONSIN PASTURE IMPROVEMENT WITH FERTILIZER

Average for all plots harvested in 1956

	No Fertilizer	500 pounds 10-10-10 per acre
Pounds dry weight yield per acre	3,224	6,777
Pounds increase with fertilizer		3,553
Dollar value of increase per acre		$88.20

Average for all plots, 1951-56

Pounds dry weight yield per acre	2,929	6,363
Pounds increase with fertilizer		3,434
Dollar value of increase per acre		$85.85

Big Return from Fertilizer in Wisconsin Pasture Tests

$88.20 in extra dry weight per acre was the average return from 500 pounds of fertilizer, in hundreds of farm demonstrations in Wisconsin in 1957 reported by the Extension Service. The fertilizer was applied in the early spring on permanent and rotation pastures, as a part of a 6-year study of pasture fertilization.

In calculating the results of these tests shown in the chart above, the University of Wisconsin considered dry weight yield of forage as 30% of the measured green weight. Value of the increased dry weight of forage with fertilizer was arrived at by considering the dry weight equivalent to 18% dairy feed worth $50 a ton. In fields where the pasture was largely timothy, and where the first clipping was at hay cutting time, the value of the dry weight of forage was figured at $25 per ton.

The greatest single increase in pasture feed production by fertilizer was on a farm where 560 pounds of 12-12-12 fertilizer produced 5,150 pounds of dry weight forage per acre. Yield without fertilizer was only 750 pounds dry weight per acre. The extra feed produced by the fertilizer figured out at $110 per acre.

A COMPLETE LINE OF Nitrogen Products

Here is the most complete line of nitrogen products available to the fertilizer industry, made by America's leading producer of nitrogen and backed by many years of experience, dependable service and expert technical assistance:

Arcadian®

NITROGEN SOLUTIONS:

URANA®
NITRANA®
U-A-S*
N-dure*

Other Nitrogen Products:

Anhydrous Ammonia
Urea Products
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American Nitrate of Soda

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Indianapolis 20, Ind.
Columbia 1, S. C.
Raleigh, N. C.
Atlanta 3, Ga.
Los Angeles 5, Cal.
San Francisco 4, Cal.

*Trade-mark

Chemicals

64—Velsicol Solvents

A new 16 page bulletin covering technical aspects of its line of solvents for herbicides and insecticides is available without charge from Velsicol Chemical Corp. The bulletin is designed as an aid to formulators in selecting appropriate solvents for the various insecticide and herbicide formulations.

The following specific properties of Velsicol solvents are covered in the bulletin: (1) Chemical compatibility with herbicides and both synthetic and botanical insecticides. (2) A high solvency for insect toxicant materials and such herbicides as the 2,4-D and 2,4,5-T esters. (3) Solutions of the insect toxicants and herbicides are stable over a wide temperature range. (4) The solvents have high flash points. (5) The solvents are noncorrosive to metals. (6) High boiling range of these solvents (low volatility) favors the residual toxicity of the more volatile insecticides.

For your free copy of "Velsicol Insecticide and Herbicide Solvents" just

CIRCLE 64 ON SERVICE CARD

65—Copper Sulfate

Three forms of Triangle Brand copper sulfate are available from Phelps-Dodge Refining Corp.: (1) Instant (powder) for quick and efficient mixing of Bordeaux sprays; (2) Diamond (snow) small or large crystals, all containing 25.2 per cent metallic copper; and (3) Basic, in powder form, containing 53 per cent copper.

Free information is available from Phelps-Dodge on Triangle Brand copper sulfate and its use in agricultural formulations.

CIRCLE 65 ON SERVICE CARD

66—Higrade Potash

U. S. Potash Co. reports its Higrade muriate of potash is free-flowing, noncaking and has K_2O content of 62–63 per cent. The company also has available Granular muriate of potash which contains a minimum of 60 per cent K_2O. If interested in more information from this potash source,

CIRCLE 66 ON SERVICE CARD

67—Tako Kaolinitic Kaolin

Excellent adhesive-absorption qualities are claimed for Thomas Alabama Kaolin Co.'s High Grade Colloidal Kaolinitic Kaolin Clay. The manufacturer says Tako excels in formulations of pesticides—inert colloidal properties increase toxic action, give increased workability, dispersion, absolute minimum drifting. Free information is available.

CIRCLE 67 ON SERVICE CARD

FREE INFORMATION to help you solve fertilizer, pesticide problems

Reader Service

68—Sodium Molybdate

Climax Molybdenum Co. now is supplying sodium molybdate and has stocks available to meet anticipated needs of fertilizer manufacturers, farm chemicals distributors and other industrial consumers. Available as crystalline technical grade, the product assays 97.0 per cent minimum sodium molybdate dihydrate and 38.4 per cent minimum molybdenum.

For more details and price information,

CIRCLE 68 ON SERVICE CARD

How to use the READER SERVICE CARD

- **Circle number of literature you want.**
- **Print or type your name, position, company and address.**
- **Clip and mail the Service Card.**

69—Potash Products

Information on its new 60 per cent standard muriate, 60 per cent granular muriate, sulphate of potash and coarse grade of muriate is available from Potash Co. of America. Just

CIRCLE 69 ON SERVICE CARD

70—New Nematode Chart

The Shell Chemical Corp. has prepared a new nematode chart which can be used as a quick and handy reference to more than 50 species of nematodes. The chart lists common names of nematodes and the plants they attack.

Classifications of nematodes that are listed include the cyst forming nematodes; endoparasitic nematodes; ectoparasitic nematodes and the above-ground feeders.

The chart is large enough to hang on a wall or put under the glass of a desk top. For your free copy just

CIRCLE 70 ON SERVICE CARD

Process Equipt.

71—Renneburg Equipment

"Renneburg Continuous Granular Fertilizer Equipment" is the title of a free bulletin from Edw. Renneburg & Sons Co. The firm says its DehydrO-Mat Dryer out-performs conventional dryers of similar volume. Built in a wide range of sizes, it is compact and easy to install in a minimum of space. For your copy of the bulletin describing the dryer and other Renneburg equipment,

CIRCLE 71 ON SERVICE CARD

72—Cascade Coolers

A new catalog from Falls Industries, Inc. provides detailed specifications on all models of the Impervite impervious graphite Cascade Cooler. The unit is said to be particularly suited to cooling large volumes of corrosives.

Diagrams, photographs and break-away drawings illustrate the catalog. In addition, a section of the booklet is devoted to a step-by-step guide intended to aid in the selection of the correct model and size of Cascade Cooler best suited for a given application. Free copies are available.

CIRCLE 72 ON SERVICE CARD

73—Rockwell Control System

An explosion-proof control system which moves petroleum and industrial liquid metering a step further toward complete automation is announced by Rockwell Mfg. Co. The system provides for automatic switch control of all pumps and quantity control valves right at the meter. Upon completion of a predetermined liquid delivery, a switch is automatically

thrown, opening an electrical circuit and cutting off simultaneously all liquid flow at the meter and all pumping action.

Details are described in a new Rockwell bulletin. For a free copy

CIRCLE 73 ON SERVICE CARD

Packaging

74—Automatic Packaging

Fully automatic packaging now has been extended to the filling of open-mouth multiwall bags with development by St. Regis Paper Co. of its VredOMatic packer, the firm reports. The packer, used in combination with a St. Regis pre-weighing scale, opens, fills, closes and sews, with or without tape, open mouth multiwall bags holding 25 to 125 pounds of granular, free-flowing materials, according to St. Regis. For more information,

CIRCLE 74 ON SERVICE CARD

75—Show Packaging

"Show Packaging"—and what it can accomplish—is the subject of a new 32-page booklet published by Hinde & Dauch. Titled "How to Merchandise with Corrugated Boxes," the new edition explores aspects of unified merchandising, the value of display, selection and use of color in corrugated packaging and the part packaging can play in special promotions.

Photographs of 30 individual packages currently in use illustrate the new publication, 17 in full color. A free copy is yours if you

CIRCLE 75 ON SERVICE CARD

Materials Handling

76—Ball Bearing Equipment

Low starting friction and free-rolling action are just two of the advantages of the new related ball bearing equipment being added to the Link-Belt Co.'s complete screw conveyor line.

Designed to fit new or existing screw conveyors, the ease of installation and maintenance is illustrated by the quick-change features of the "Quik-Link" conveyor screw, single and double ball bearing trough ends; new ball bearing hanger and completely enclosed single reduction helical "Motogear."

Technical data on the new related ball bearing equipment is now available. For your copy just

CIRCLE 76 ON SERVICE CARD

77—Speedy Counter

Two models of a new electric counter which records up to 200 counts per minute are described in a new brochure just offered by Richardson Scale Co. The firm says these counters accurately count boxes, cartons, packages or individual objects as produced or as conveyed past a checking point. Operation and advantages of the counters are described and a close-up photograph included in the technical reference. For a free copy,

CIRCLE 77 ON SERVICE CARD

How to use the READER SERVICE CARD

- **Circle number of literature you want**
- **Print or type your name, position, company and address.**
- **Clip and mail the Service Card.**

78—Push-Pull Loader

Yale & Towne Mfg. Co. offers a new bulletin on its Push-Pull Loader with Integral Sideshift, which is used for palletless handling. In addition to complete specifications on the attachment which can be fitted to any Yale industrial lift truck, the bulletin pictorially describes the proper procedure for handling without pallets.

CIRCLE 78 ON SERVICE CARD

See pages 58 for information on these Reader Service Numbers—

85—Munson Mixer
86—Richardson Scale
87—Bucket Elevator
88—HO Payloader
89—Brooks Flowmeter
90—Baughman Transport

Miscellaneous

79—Pocket Safety Folder

A revised edition of a pocket-sized safety folder including a revised list of antidotes for all agricultural chemicals now is available free from United-Heckathorn.

This pocket-sized edition also contains a new section on the disposal of empty containers along with a list of the latest approved safety equipment for handling of agricultural chemicals. For your free copy of this safety folder

CIRCLE 79 ON SERVICE CARD

80—Soil Test Outfits

Edwards Laboratory says its Simplex Soil Test Outfits are not only soil testers, but combination Soil and Tissue test outfits based on scientific methods devised at Michigan State College. Free literature is available on three kits—complete, junior and farm outfits.

CIRCLE 80 ON SERVICE CARD

81—Thermometers & Hydrometers

Central Scientific Co. has just published a 24-page booklet featuring the latest information on thermometers and hydrometers. Containing a listing of ASTM, general and specific purpose thermometers and hydrometers, the bulletin gives complete specifications and prices. A copy may be obtained if you

CIRCLE 81 ON SERVICE CARD

82—Spray Protection

A new bulletin has been published by Willson Products, Inc. on its Agri-Tox Respirator used for handling and applying toxic farm chemicals. The device is accepted by USDA as protection against Systox, Parathion, TEPP, Aldrin, Chlordane and other pesticides, Willson reports.

For your copy of the bulletin

CIRCLE 82 ON SERVICE CARD

83—Conversion Wall Chart

A reference table for engineers and other executives in wall chart form has been published by Precision Equipment Co. Included are common conversions such as inches to centimeters, watts to hp, as well as many conversions that are difficult to locate in reference manuals; i.e., atmospheres to Kgs/sq. cm., cu. ft. to liters, microns to meters, etc.

For your free wall chart

CIRCLE 83 ON SERVICE CARD

84—Products & Processes

A 28-page four color booklet entitled "ASARCO Products and Processes" has been published by American Smelting & Refining Co. Containing more than 30 color and black-and-white photos, the booklet is a pictorial review of the firm's mining, smelting, refining and research operations. For your copy

CIRCLE 84 ON SERVICE CARD

Meet The Demand For High Analysis

Use

DAVISON'S TRIPLE

Superphosphate

State Agricultural Experiment Stations and other authoritative sources are recommending fertilizers with ever increasing plant food units per ton. High analysis fertilizers are in demand because they give more for each fertilizer dollar. Meet this demand by incorporating Davison's New Triple Superphosphate in your formulation.

Davison's Triple Superphosphate has 45/46% available P_2O_5 and is supplied in the easy-to-use granulated form or run-of-pile.

Order Davison's Triple Superphosphate. For complete information, call or write.

Progress Through Chemistry

DAVISON CHEMICAL COMPANY

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PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, SUPERPHOSPHATES, TRIPLE SUPERPHOSPHATES, PHOSPHATE ROCK, SILICA GELS AND SILICOFLUORIDES. SOLE PRODUCERS OF DAVCO® GRANULATED FERTILIZERS.

Presenting

THE MOST MODERN BAG PRINTER

Manufactured in

One, Two, Three and Four Colors for printing made up bags of Paper, Cotton and Burlap, new or used.

Let us send you complete information with descriptive literature.

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One machine to handle
ALL bulk and bagged materials

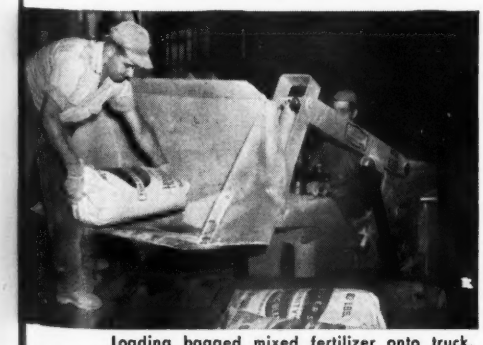
Illinois fertilizer plant buys Michigan's quarry-proved dependability

To everyone who uses material-handling equipment, the problem of dependability is a critical matter. It becomes absolutely vital, though, when you're like Hoover Soil Service of Gilman, Illinois.

Hoover's problem was to find a machine which *by itself* could handle *all* material in their bustling 20-year-old fertilizer plant. It had to be fast and versatile and, above all, as trouble-free as possible. Their study of available units included the usual comparison of specs, talks with salesmen and users, pricing, and so on.

Power Shift, Torque Converter

"Our ultimate choice was a Michigan Tractor Shovel!" says Owner Roy Hoover.



Loading bagged mixed fertilizer onto truck, Michigan often lifts 18 bags (1,440 lbs) at once.

"There were lots of reasons. But the clincher came the day we learned that our neighbors, Lehigh Stone Company of Kankakee had changed to Michigans and were very happy with them. If a Michigan could work satisfactorily under the constant use of their quarry, we reasoned it certainly would do well on our less-punishing job. The size we wanted, Michigan's 15 cubic foot Model 12B, we noted had many of the same design features as the larger quarry-model Michigans (including power-shift, torque converter, planetary axles). So we got it —and it's done even better than we hoped."

Drives safely, quickly in traffic

Today the 44 hp, 11 mph Michigan does *all* handling and *all* lifting not only at Hoover's main plant but also at their auxiliary warehouse four blocks away. Trips back and forth take only two to five minutes despite necessity to travel along the town's busy main street (U.S. 54-45-24).

Easily maneuvers through 5′ door

Unloading boxcars is a typical job. Average 50 ton car requires less than 100 trips for complete unloading, according to Owner Hoover. *"Michigan has no trouble getting in or out of any single-door car,"* he adds, *"regardless of whether it has a 5-foot or 6-foot door.* Our bucket has been extended two inches, too, over the standard bucket."

Feeds mixer, lifts bags, spots cars

Other Michigan jobs include stockpiling bulk phosphate, potash, urea and other raw materials and feeding the one-ton mixer. Michigan also hauls bags of mixed fertilizer. It loads both bagged and bulk material onto trucks. It spots boxcars, one or two at a time, both loaded and empty. Despite its heavy work schedule a simple maintenance program has reduced downtime to practically zero.

See 12B in action in your plant

Dependability and versatility like this are features of *every* Michigan Tractor Shovel. Let your Michigan distributor help you pick the size best suited to your needs: 6 cubic *feet* to 5 cubic *yards.*

Michigan is a registered trade-mark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2461 Pipestone Road
Benton Harbor 8, Michigan

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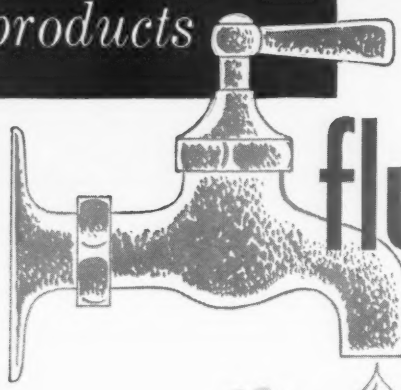
SULPHUR

helps to create headline products



fluoridated WATER

CHEMICAL PROGRESS WEEK APRIL 8-12

Some communities will, some won't . . . adopt fluoridation of drinking water for the purpose of reducing tooth decay. The subject is hotly debated but one thing is certain: wherever fluoridation is adopted a derivative of Sulphur will enter the picture.

Several chemicals can be used for fluoridation but they all stem from hydrogen fluoride. To produce this gas, a fluoride-bearing mineral is reacted with sulphuric acid.

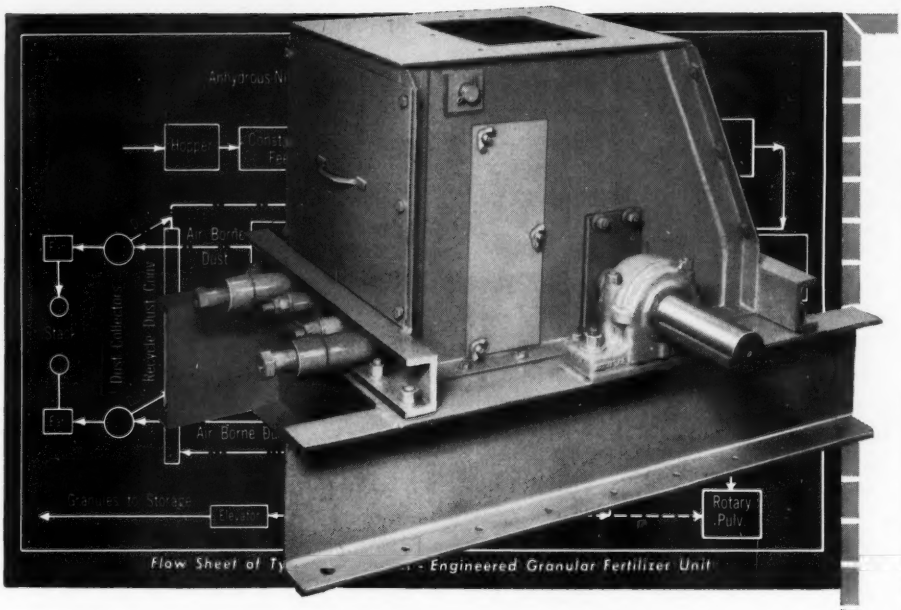
As today's Headline Products are studied, it's significant that so many require for their production one or more derivatives of Sulphur.

Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N.Y.
811 Rusk Avenue, Houston 2, Texas

Sulphur Producing Units
- Newgulf, Texas
- Moss Bluff, Texas
- Spindletop, Texas
- Worland, Wyoming

This Rotary Pulverizer Belongs In Your Fertilizer Unit, Too!



Flow Sheet of Ty... - Engineered Granular Fertilizer Unit

IT'S STURTEVANT-ENGINEERED TO GRIND UP TO 35 TONS OF TAILINGS PER HOUR

Mixing plant operators agree! They'll tell you that a Sturtevant Rotary Pulverizer beats anything else for keeping a granular or powdered fertilizer unit speeding along at full capacity. It's far better than Hammer Mills with hammers that stick . . . Cage Mills that skip small pellets . . . Knives that only slice and shear. No overload stoppages nor clogged grates. So, daily accumulation of over-sized lumps is no longer a problem. And, to top it off, original Sturtevant "Open-Door" accessibility makes cleaning quick and easy.

Sturtevant Engineering can also help you in other ways. For more than 75 years, leaders in the fertilizer industry have depended on us for assistance in designing their units and in keeping them up-to-date. Since we custom-build mixers, batching units, granulators, hopper and conveying systems to fit agreed-upon specifications, you can be sure of getting a complete unit or individual components that fit your requirements like a glove. Why be satisfied with anything less?

Investigate now! Filling out the convenient coupon at the right is the first step toward better fertilizer at lower cost. Why not mail it today?

STURTEVANT

Dry Processing Equipment

The "OPEN-DOOR" to *lower* operating costs over *more* years

CRUSHERS • GRINDERS • MICRON-GRINDERS • SEPARATORS
BLENDERS • GRANULATORS • CONVEYORS • ELEVATORS

I am interested in a new unit ☐ conversion ☐

Desired capacity is _____

Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____

STURTEVANT MILL COMPANY, 140 Clayton Street, Boston 22, Mass.

Please send me bulletin on Rotary Pulverizers ☐
Also bulletins on Sturtevant machines for:

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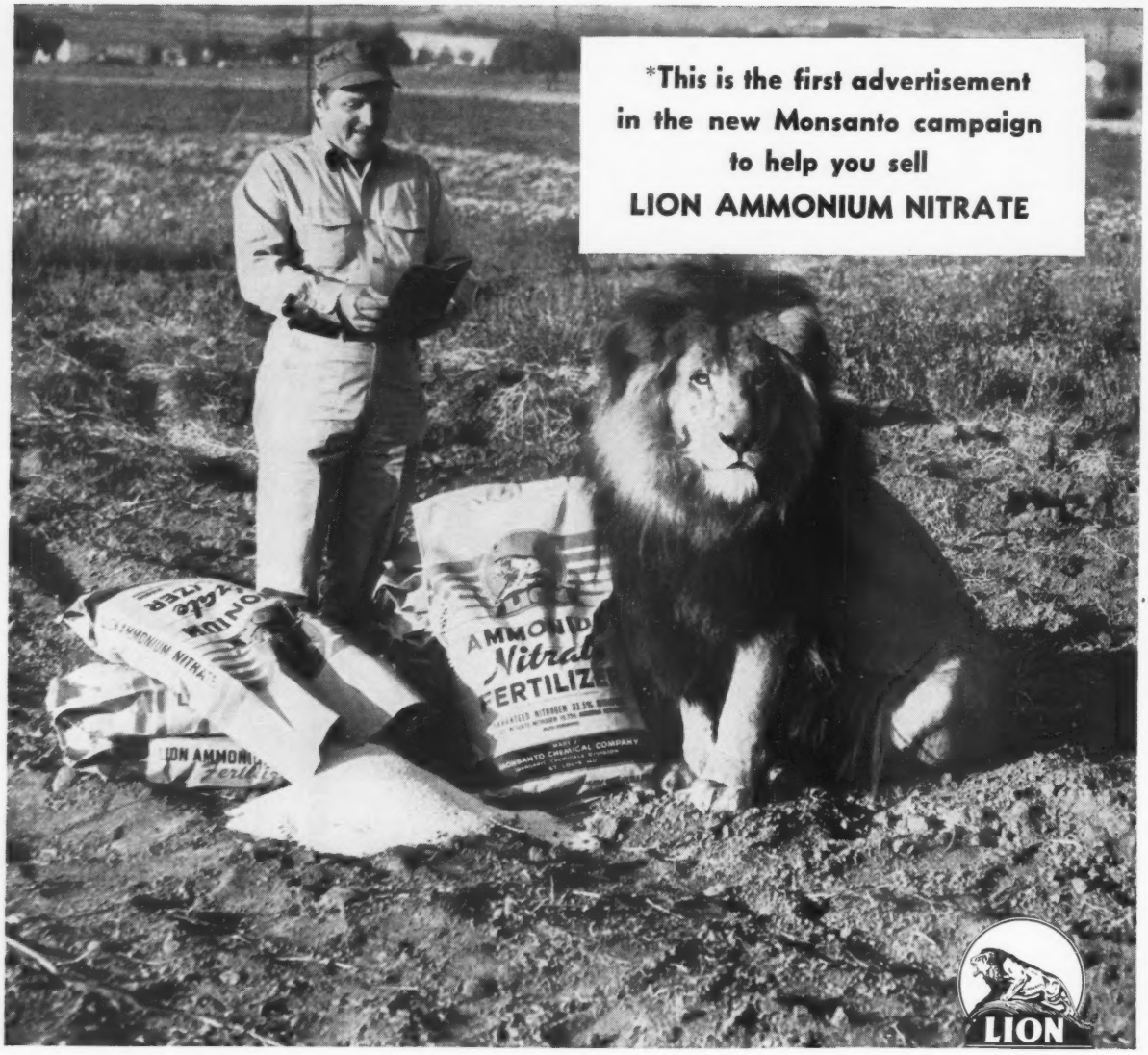
☐ MICRON-GRINDING ☐ SEPARATING ☐ MIXING
☐ SCREENING ☐ FEEDING
☐ MECHANICAL DEN & EXCAVATORS ☐ ELEVATING & CONVEYING



You save money with LION in your fields

LION BRAND AMMONIUM NITRATE IS A LOW-COST SOLID NITROGEN FERTILIZER

FOR LOW-COST NITROGEN, LION is the brand. Lion Ammonium Nitrate is guaranteed to contain 33.5% nitrogen, which means lower-cost nitrogen for your crops . . . more for your money in bigger crop yields.

FOR MORE PRODUCTION, Lion Ammonium Nitrate contains TWO kinds of plant nitrogen. *Quick-acting* nitrate nitrogen that gets crops started fast . . . and *long-lasting* ammonia nitrogen that resists leaching and feeds your crops steadily during the important growing months that follow.

FOR EASIER SPREADING, Lion Ammonium Nitrate is in pellet form. These pellets are specially coated to withstand caking . . . then packed in specially lined, moisture-resistant bags. Here's double assurance Lion brand will flow freely, spread evenly after shipment or storage.

MADE BY WORLD'S LARGEST. Lion Brand Ammonium Nitrate is made by Monsanto Chemical Company, world's largest producer of prilled ammonium nitrate—and *your* most reliable source of *low-cost* nitrogen. Save money. Buy *Lion!*

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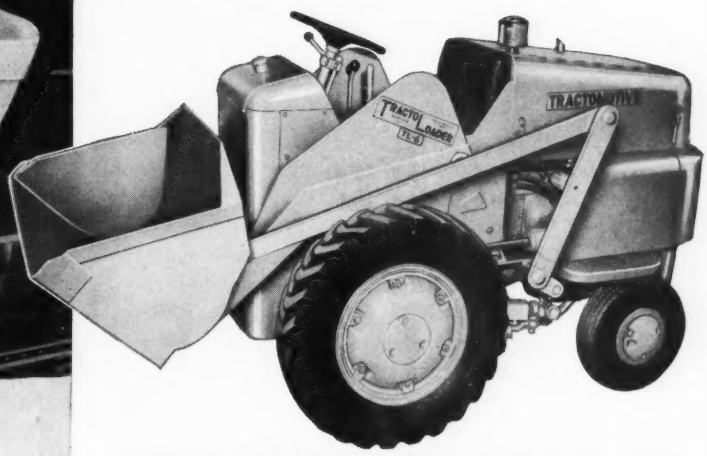
BUCKET CAPACITY: ½ cu yd
BRAKE HP: 33.7
SPEEDS: 2 forward; up to 10 mph
2 reverse; up to 20 mph
WEIGHT: 6,100 lb



TRY THIS FOR SIZE IN TIGHT QUARTERS

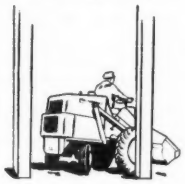
Compact TRACTOMOTIVE TL-6 TRACTO LOADER is a high producer in confined areas

Quickly unloads boxcars Users report it takes only two to three hours to completely unload a boxcar of bulk materials by using the TL-6 and a conveyor setup. Loading goes fast because there's a scooping action with tip-back bucket — and no ramming to get load. You ease bucket into pile and the hydraulic torque converter drive crowds in a heaping load — action is smooth, positive. No gear shifting either — operator just pulls or pushes a lever to go forward or reverse.

Travels through narrow aisles and doorways Compact design makes it easy to move material from one place to another in your plant . . . or to bring in material from outside stockpiles. Over-all length is only 9 ft, 7 in; width 4 ft, 5 in; height 5 ft, 4 in.

And loads are carried low, in a level position, with 50-degree tip-back of bucket — means less spillage, greater stability, better visibility and easier maneuvering.

Makes hairpin turns around columns and posts TL-6 keeps travel time down because it makes right-angle turns around columns and posts. No lost time maneuvering around, either — there is a short, 6½-ft turning radius. And the operator's job is made easier with Power Steering — now standard equipment!



Ask your Allis-Chalmers construction machinery dealer to show you how you can save time and money on close-quarter material handling with the TL-6 Tracto-Loader. See for yourself why

TRACTO is a sure sign of modern design

SOLD AND SERVICED BY YOUR ALLIS-CHALMERS CONSTRUCTION MACHINERY DEALER

Send For Free Descriptive Catalog On The Complete Line Of Tracto-Loaders ▶

TRACTOMOTIVE

TRACTOMOTIVE CORPORATION • DEERFIELD, ILLINOIS

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Deerfield, Illinois

☐ Please arrange a demonstration of the TL-6
☐ Send catalog on Tracto-Loaders

Name .....
Title .....
Company .....
Address .....
City ..... State .....

THE NEMATOCIDE MARKET

The Shell Chemical Corporation is one of the companies that is promoting the fight against the pesky nematode. They sponsored a Nematode Workshop in New York in January. This "first of its kind" workshop attracted over 200 dealers, formulators, manufacturers, applicators and scientists. Fourteen leading nematode authorities led the various discussions.

Dr. S. H. Benedict, Agricultural Sales Division of Shell Chemical, emphasized the point that today nematode control is limited to crops of high cash value. But as the problem becomes more widely recognized, and more people engage in research we can expect the development of more efficient nematocides which will ultimately help all farmers to cut nematode losses.

FARM CHEMICALS is, of course, interested in the more technical aspects of the nematode problem. However, we agree that getting "farmer acceptance" for any control program is going to play an important role in the success of that program. It is for this reason that we are reprinting a paper on "The Nematocide Market" presented at the Shell Nematology Workshop by A. L. Taylor, Principal Nematologist in charge of the Section of Nematology, Agricultural Research Service, USDA, Beltsville, Maryland.

NEMATODES are a widespread and important economic problem in all parts of the United States, and for that matter in other parts of the world as well. I would like to sum that up by saying that the nematocide salesman can take the presence of some sort of plant parasitic nematodes for granted. We who have worked with nematodes for years and have examined thousands of plant and soil samples are always surprised to get a sample which does not contain some kind of plant parasitic nematodes.

The question so far as the salesman is concerned is not: Are there nematodes in this field? The answer to that is always yes. And while he would like to know what kinds and how many there are, this information is seldom available, nor does he have any easy means of obtaining it. The answers he really wants are to these questions:

1. Are there enough nematodes to damage the crop appreciably?

2. Can the grower make a profit by controlling the nematodes?

We will examine these questions a little more closely. Damage as used in the first question is reduction in yield or quality or both; that is, anything which would reduce the grower's income from the crop. Appreciable damage is damage amounting to about 25 per cent or more. In other words, enough damage so that the grower is aware that something is wrong, or enough damage so that the control demonstrations will produce unmistakable results.

Question 2, which has to do with whether the grower can make a profit by control of nematodes has several angles. We will examine a few of the most important of these.

As a starter, what is meant by a profit? How much return does the grower expect on his investment in nematocides? Obviously, he is not interested in investing his money in soil fumigation unless it will increase his profits in some sort of proportion to the money invested, and to the risks involved in crop production. The farmer planting a crop is investing his money in the hope that he will have a good growing season with rain when he needs it and none when he does not; he hopes that he will be able to protect his crop from damage by insects and plant diseases; he hopes that it will not be damaged by hail or other natural hazards; and he hopes that he will get his crop to a favorable market. Obviously, there are a lot of things to go wrong. Without going into detail, one learns by experience that the prudent farmer wants returns on his investment of money

spent on crop production of about four to one. If he invests $25 per acre in nematocides, he wants to have reasonable prospects of getting an additional $100 per acre when he sells his crop. That is, $100 over and above the amount he would have received if he had not used the fumigant.

One seldom meets a farmer who is accustomed to figuring costs and returns in exactly this way. Nevertheless, the ratio of four to one between cost of production and selling price governs the thinking of most good farmers. An agricultural economist will also use this ratio in calculating how much fertilizer can be profitably applied to a crop and for similar purposes.

We are now prepared to do a little calculation. We will assume that an application of 200 pounds of D-D will increase the crop value on an acre by 25 per cent, as it often does. The cost of this amount of D-D with an allowance for application can be estimated at $30. If the farmer expects to get four times his investment back, he should have a reasonable prospect of an increase of $120 in the selling price of the crop from that acre. This $120 is then one-fifth of the total selling price of the crop, or the total value of the crop per acre is $600.

We will go over that again, using tobacco in North Carolina as an example. In North Carolina, a nematode infested acre might produce 1,000 pounds of tobacco, which will sell at an average price of 50 cents a pound. Returns per acre will then be $500. Fumigation with D-D increases production by 25 per cent, or 250 pounds of tobacco, making a total of 1,250 pounds from the fumigated acre. At the same average price of 50 cents per pound, the income from this acre is then $625, or $125 more than from the unfumigated acre. The farmer, having a return of more than four to one for his $30 investment in D-D is ready to try it again next year.

This sort of arithmetic backed up by demonstrations, has resulted in an increase of the use of soil fumigation in the Carolinas from nothing at all ten years ago to nearly half of the 900,000 acres of tobacco in those states.

The four to one ratio I have been talking about is the minimum. Sales resistance decreases in inverse proportion as the ratio between cost of fumigation and crop returns increases.

There is about 4,800 acres of shade tobacco in the vicinity of Quincy, Florida. Shade tobacco is used for cigar wrappers and the average selling price is nearly $2 per pound. With yields in the vicinity of 1,000 pounds per acre on unfumigated soil, returns are about $2,000 per acre. Use of D-D at $30 per acre steps up production 25 per cent or 250 lbs. per acre, as in the cheaper flue cured tobacco in the Carolinas. But this 250 pounds of tobacco is worth $500, or more than 16 times the amount invested in D-D. Within four years after the initial experiments in that area, all of the shade tobacco was being planted on fumigated soil.

Anything that reduces the cost of fumigation without reducing effect on the corp helps produce a favorable ratio of costs to returns. Many farmers in the Carolinas use row treatments on their tobacco land at a cost of about $15 per acre and with returns in the neighborhood of $100 per acre; a ratio of 6 or 7 to one.

Figuring another way, one might say that an increase of 60 pounds of 50 cent tobacco per acre will pay for a $30 fumigation job. If the farmer is to be interested in making the investment, he should have some assurance that he will get 4 times that amount additional per acre or 240 extra pounds.

It will also be evident that, at the present price of soil fumigation, only crops of fairly high value per acre will give the farmer the desired ratio of costs and returns. Going back to our example of tobacco in the Carolinas, it will be seen that the cost of the fumigation job, $30, is about 1/16th of the $500 selling price of the crop from the unfumigated acre, or about 1/20th of the selling price of the crop from the fumigated acre. This ratio of about 16 or 20 to one is useful in calculating which crops might be profitable to fumigate and for eliminating those which obviously are not. In other words, for figuring where the markets are.

If fumigating the soil will increase yields by 25 per cent and the present average price per acre is about 16 times the cost of the fumigation, the grower should be interested. If yields cannot be increased by an amount at least four times the cost of the fumigation, the market is a doubtful one.

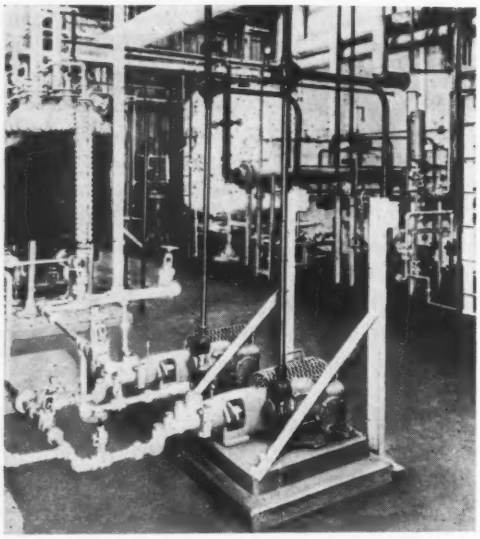
The book *Agricultural Statistics, 1956* contains data on acreages, average yields of average values per acre for most crops in the United States. There is sufficient data for figuring whether the ratio for a particular crop in a particular section is favorable for fumigation or not. In using this book, remember that the figures are mostly averages and that in farming there is a fairly wide spread between the crops raised by the best farmers and the poor ones.

Another useful book is the *General Report* of the United States Census of Agriculture, 1950, or perhaps by now, 1955. This has rather more detailed information on crops than *Agricultural Statistics* and its companion volumes break down a great variety of agricultural statistics to the county level. These books are for sale by the Superintendent of Documents, U. S. Government Printing Office at $1.75 for *Agricultural Statistics* and $7.50 for the *General Report* of the Census of Agriculture.

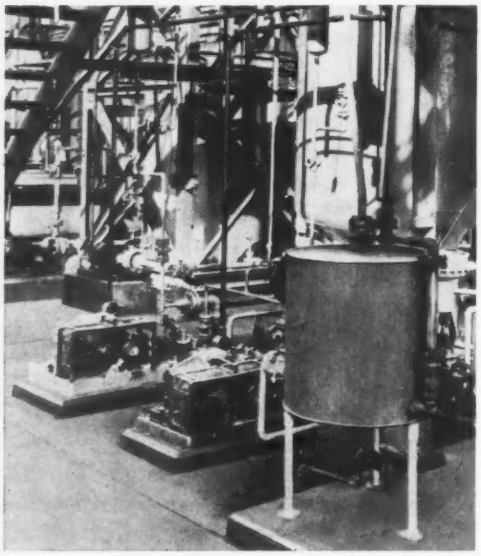
I think I can summarize what I have said very simply. If you are looking for a place to sell soil fumigants, try to figure out where the money is. You can take the nematodes for granted. Knowing where the money is, it is possible to arrange demonstrations which will show the growers that they can make money by using soil fumigants. ▲

PUMPS CAN SOLVE YOUR FLOW CONTROL PROBLEMS

By H. M. Godson, Plant Manager
Calhio Chemicals, Inc.



Material balances are maintained on the distillation unit by three pumps such as this one which continuously withdraws a fixed amount of condensed overhead. Pumping capacity is determined by a screw adjustment of the plunger stroke length.



The constant level tank in the foreground determines the suction pressure on the PMM feed pump to the reactor. The feed pump has a manual dial adjustment on stroke which can be changed while the pump is operating.

THE continuous production of an effective fungicide requires very exact flow control of highly corrosive chemical solutions. At Perry, Ohio, Calhio Chemicals, Inc., a subsidiary of Stauffer Chemical Company, solves the problem of exacting flow control through precision pumping at five strategic points in its production of Captan, an agricultural fungicide.

When the growing season is best for farm crops, the climate is also favorable for the rapid growth of crop-destroying fungi. Thus, just when a farmer might expect the biggest yield from his land, he may instead lose much of his crop to fungi. With the aid of chemicals, today's farmer can protect his crops with fungicide at a nominal cost per acre and thereby harvest a higher yield. While fungicides are only needed for about six months of the year as the growing season moves north, fungicide production is an all year around-the-clock job; for it is through the efficient use of plant facilities that the chemical industry is able to supply chemicals at prices farmers can profitably afford.

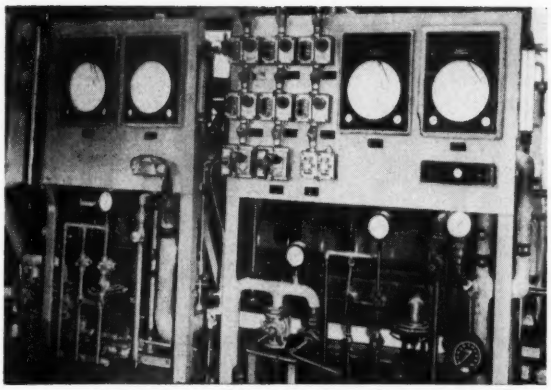
PRODUCTION OF CAPTAN IS CRITICAL

Two critical stages in the production of Captan require very close control to maintain material balances—(1) the distillation of solvents to obtain high purity PMM (perchloromethylmercaptan) and (2) the reaction of PMM with other chemicals classified as P-10 to form Captan (see Fig. 4). Distillation requires close control of feeding rates to the still and of the rate at which PMM and the solvents are withdrawn. All three rates are interrelated and their relationship must be maintained. The solvents are distilled off and condensed. A portion of the accumulated solvents is pumped to storage while the balance returns to the column as reflux.

To obtain high purity PMM, the bottoms from the still must be removed at a pre-calculated rate proportional to the feeding rate. Once both feed pump and bottoms pump are set, they must continue to operate in parallel with no deviations from the preset controlled volumes.

STOICHIOMETRIC REACTION

PMM and P-10 react in exact stoichiometric amounts to form the fungicide. Excesses of either



Instrument panel for reactor centralizes control of flow, pH and temperature for the production of Captan.

chemical could impair product quality and reduce its effectiveness as a fungicide. Also excesses must be eliminated to keep production costs down.

To obtain the greatest possible pumping accuracy, constant level tanks are used to eliminate suction pressure changes. These tanks are equipped with float-controlled valves which automatically maintain constant levels. As an additional check on the amount of chemicals that react to form the fungicide, the operators determine pump capacities with a stop-watch four times each shift.

With careful pH and temperature control in the reactor system, the reaction proceeds to completion. The end product, Captan slurry, flows to a filter where the filter cake is conveyed to a flash drier and then bagged as Technical Grade Captan. The resulting product is a creamy, light brown powder with particle size measured in microns. Technical Grade Captan must then be mixed with other chemicals, such as wetting agents and diluents, before it can be used by the farmers.

SPECIAL PUMP SPECIFICATIONS

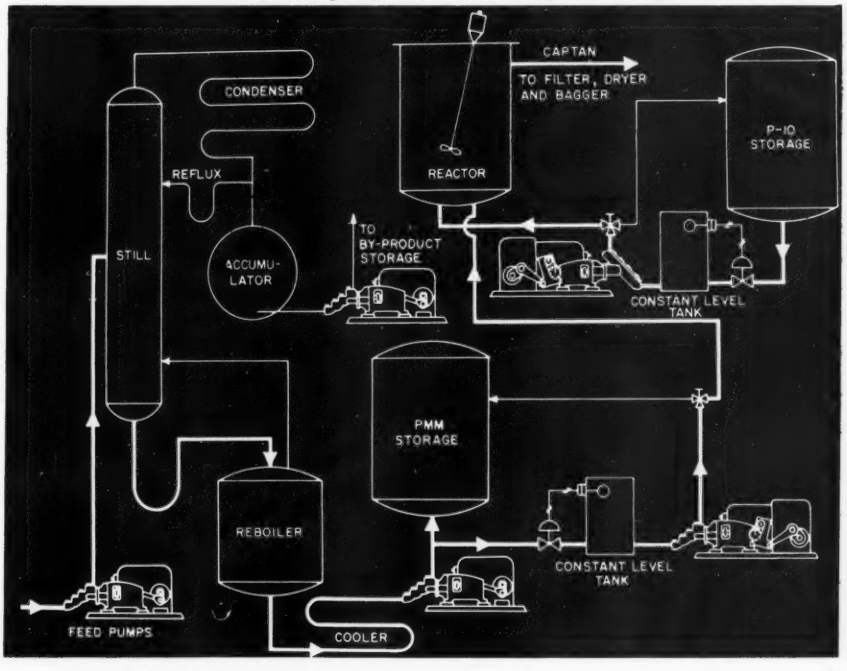
The pumps that are so critical in the production of Captan are all Milton Roy controlled volume pumps. To prevent iron contamination of intermediate chemicals, the three pumps connected to the still and the reactor feed pump for PMM are equipped with Monel liquid ends, Hastelloy B ball checks and ceramic plungers.

Not only must the pumps be accurate but once they are set, it is important that they retain the capacity settings throughout a shift. Capacity changes on the three pumps for the still are made by screw adjustments of stroke length while the pumps are stopped. The two pumps for the reactor have manual dial adjustments for the plunger stroke, which can be made while the pumps are operating.

All pumps are installed with duplicate stand-by units with manifolds which permit either pump to be used while the other is serviced. Complete control of flow to the reactor is centered at an instrument panel adjacent to the reactor. Valves below the panel permit the operator to open or close flow lines to the reactor and return lines to the storage tanks.

There are three reasons for using controlled volume pumps in the production of Captan—(1) to obtain high control accuracy at low flow rates, (2) to maintain capacities over sustained periods and (3) to reduce the amount of equipment exposed to the corrosive fluids. With controlled volume pumps it is possible to react chemicals in stoichiometric amounts. ▲

Pumps strategically control flow at five points in the production of Captan.



This picture was taken in the 1920's and shows W. H. Volck, an entomologist, at work in the tiny laboratory in Watsonville, California, Calspray's first headquarters.

ravages of the codling moth were coming dangerously near to sounding the death knell of the apple industry here in the Pajaro Valley. In the spring of 1903, Professor Woodworth, chief of the University of California's Department of Entomology, at the request of the Orchardists' Association, sent two young graduate students, W. H. Volck, an entomologist, and E. E. Luther, a chemist, to investigate the codling moth problem."

"At this time there were a number of commercial sprays upon the market, none of which were absolutely safe to use and many of which were ineffective, doing little good with large danger of injury. The type of arsenate of lead, then available, was found to be quite as erratic as Paris Green under the local conditions."

"After conducting hundreds of experiments, success finally crowned their efforts, and the new method they discovered for making lead arsenate was destined to save the apple industry in the Pajaro Valley."*

"They decided to manufacture the new lead arsenate in Watsonville and for this purpose the California Spray-Chemical Company was organized.

CALSPRAY'S

AN ACCOUNT of the struggles and triumphs of the California Spray-Chemical Corporation illustrates the growth and development of the entire farm chemical industry.

Today, after 50 years, Calspray can claim the rank of the world's largest company *specializing* in agricultural chemicals. And among the corporations producing industrial as well as agricultural chemicals, Calspray ranks first in agricultural pesticide sales volume.

But it wasn't always this way! There are men still with the company who remember when it was a struggle for the firm to meet the monthly payroll.

In 1907, when Calspray had its beginnings, chemical pest control had barely been recognized as an important, even vitally necessary, substitute for "warfare by hand" with the steadily multiplying insect hordes.

To fill in the early picture, we borrow excerpts from the March 10, 1917 issue of the Watsonville, California newspaper, the *Pajaronian*, which printed a tribute on the occasion of Calspray's tenth anniversary.

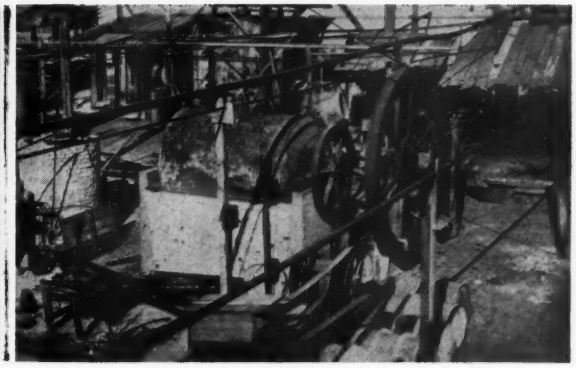
"The Company had its origin at a time when the The next few years was a battle for existence against larger and better established Eastern companies.

"If the California Spray-Chemical Company had succumbed at that time it would be entitled to everlasting credit for accomplishing three things that should be appreciated by every grower in the community. One of these was the discovery of the only arsenical spray in existence that could be used safely on certain important crops. The second was that by manufacturing its spray in Watsonville it reduced the price of sprays for the growers and saved thousands of dollars to the Valley. (The new system of manufacture was in itself less expensive and later adopted by other manufacturers.) The third is that the local company forced its competitors to put a higher grade of sprays on the market and to replace their former dangerously injurious materials. The discovery of this process marked a new era in the manufacture of insecticides."

Other Volck inventions followed rapidly: In 1912,

** The new "method" involved the use of litharge instead of lead acetate, to make lead arsenate, utilizing a small amount of acetic acid as the catalyst.*

This is an air view of the California Spray-Chemical Corporation's present manufacturing plant in Richmond, California.



This is an "over all" view of the California Spray-Chemical Corporation's first plant in Watsonville, California, in 1910.

a process for manufacturing lime-sulfur solution from crude lump sulfur rather than ground sulfur. In 1921, a solvent method for extracting and recovering alkaloids. This was put to use at the Watsonville plant for the extraction and purification of strychnine from nux vomica seeds. In 1923, a method for the manufacture of powdered sulfur. In 1924–1928, a series of inventions involving white or phytonomic oil sprays. These included the development of the phytonomic oil itself; the invention of a quick-breaking emulsion; the development of oil as a fungicide; the development of a phytonomic white oil with improved oxidation stability; the "balanced emulsion" formulation for phytonomic oils; the use of oils as plant stimulants, and the invention of a petroleum oil sulfonate emulsifier.

first FIFTY YEARS

By this time the Volck name was revered in the field of entomology and young graduates in the profession were eager for the opportunity to work with him. One of these was Hugh Knight who invented the self-emulsifying or ready-mix type of oil, and developed a new "combination"—a phytonomic oil plus a poison. Another was W. B. Parker who, in 1931 began a series of inventions that introduced an important new method of application, the Vapo-Dust or mist spray method. These included a Vortex nozzle for mist spraying, a knapsack Vapo-Dust machine, a power mist sprayer, the fish tail nozzle such as used on airplanes for vapor spraying, a modified fish tail nozzle and various other mechanical devices utilized to apply pure oil, inverted oil or oil concentrates with suspended solids using air as the carrier.

Another of the "youngsters" attracted to the Volk laboratory was Dr. A. C. Sessions who, in 1931, developed "Coposil." Up to that time Bordeaux Mixture was the standard copper fungicide, and Sessions' invention opened up a new frontier of insoluble copper fungicides. Among his contributions was the invention of copper calcium silicate complexes, the use of a silicate or equivalent radical to chemically combine or safen metallic ingredients in sprays, and a mercury silicate fungicide for use as a plant spray.

The research activity detailed above, might be compared to the filling in of the primary colors in a full color engraving. The inventions must be implemented by manufacturing and marketing, merchandising, advertising and sales promotion before the picture is complete.

In 1913 two salesmen were added to the plant personnel at Watsonville which then consisted of five employees. These men introduced Ortho products to the neighboring Santa Clara and Sacramento Valleys. In 1916, exploration of opportunities in

the Pacific Northwest was made by one Calspray employee on motorcycle, and in 1917 desk space was obtained in Seattle's Henry Building—Calspray's first branch office.

A dramatic demonstration of the efficiency of the Volck phytonomic oils in the Northwest in the mid-twenties marked an important milestone in Calspray expansion. The Volck oil sprays were shown to give excellent control of San Jose Scale without injury to trees. Volck oil spray also killed scale crawlers, red spider eggs and codling moth eggs. The material thus proved to be an ovicide as well as an effective insecticide.

Orders poured in and an entomologist was hired to head up Research Development in the Northwest. Experiments there led to the development of new spray schedules and use of products for control of fruit tree insects.

By this time, there were enough materials on the market, each with its own set of rules regarding dosage, time of application, etc., to complicate utilization by the farmer. This situation led to one of the most important marketing decisions in Calspray's history—the decision to hire as salesmen only such men as had training in entomology or plant pathology. The theory was that the company was selling a "program" of pest control, not just products. Only trained "field" men could properly diagnose plant diseases and insect problems and advise farmers about what to use when, how, and in what amounts.

In the opinion of Calspray's president, Arthur W. Mohr, this decision more than any other single factor is responsible for the company's successful growth. "The importance of selling a 'program' rather than individual products, and the availability of trained field men to oversee the program in every locale, increases as farm units increase in size and growers become more dependent on scientific pest control to lower unit cost of production."

Sales expansion was quickly followed by the expansion of manufacturing facilities. In 1929 Calspray built a plant in Elizabeth, New Jersey to serve Eastern markets. The next year, the Watsonville operation was moved to Pittsburg, California following the purchase of the National Chemical Company plant there. In that same year, a plant was built in East St. Louis, Missouri, an oil plant was constructed in Richmond, California, and the main office was moved to Berkeley. Calspray was acquired by the Standard Oil Company of California and the Standard Oil of New Jersey, and in 1936 Calspray's present Richmond, California, plant was built and the Pittsburg operation disbaned.

As all who are connected with farm chemicals well know, a new discovery or development can wreak havoc overnight with established practice and products. Calspray had worked itself up to a position of leadership in the production of inorganic pesticides and was ready to put into operation several improved methods of manufacture that would have still further strengthened its position when DDT, the first of the present day organics, made its appearance.

An entirely new set of problems embracing chemical supply, formulation, physical preparation, toxicity to warm-blooded animals, and the enormous question of upsetting balance between pests and their predators faced the industry. Research in pest control quickly became the organic chemists' paradise and the processor's headache.

Most of these organics were sticky or wax-like in character. One of Calspray's first contributions to the new era was their development of a method of reducing the particle size of dust concentrates to micro fineness in machines that were economical to build and operate and which involved no air compressors, which were hard to obtain. Through this development, the industry was served more fully with the requirements of the new miracle insecticides than would have been possible if preparation of all such formulations had been confined to pulverizing processes available on the market.

Lindane, the pure gamma isomer of Benzene Hexachloride, is a Calspray development, as is TEPP, a tetraethyl pyrophosphate. The most recent Calspray contribution is Orthocide (captan) which is fast proving to be the most versatile fungicide on the market today, effective against many of the major diseases afflicting fruits, vegetables and ornamentals.

Calspray's entry into the plant food field was reported on these pages recently. To reiterate briefly—the investment in a multi-million dollar plant was undertaken only after study of the potential need and after practical experience to ascertain the "compatibility" of plant food-pesticide marketing. Purchase of Mid-State Fertilizer Company in 1953 supplied the test experience and convinced company officials of the great need for a basic source of plant food materials in the West, and convinced them, too, that plant foods are a natural complement to pesticides and can be handled efficiently by their long established marketing organization. To insure the same kind of supervisory field service that the company has established for their pesticide line, Calspray has employed a staff of trained agronomists.

Calspray now has four manufacturing plants in this country—California, Missouri, New Jersey and Florida—and a new plant near Marseilles in France. There are 46 Calspray dust mills and liquid formulating plants in this country, Canada, Mexico and Puerto Rico and a total of 82 district and branch offices in this country and abroad. ▲

MEXICO'S "NEW LOOK"

by Emil Zubryn

MEXICO has the potential to supply fertilizers (chemical and natural) to all the Central American republics, according to Ramon Mendiolea, a prominent agricultural expert from Nicaragua. Mendiolea has in recent months been conferring with Mexican officials about the forming of a Latin American agricultural organization between Mexico and the Central American republics.

According to Mendiolea the need for large quantities of fertilizers is urgent. Cotton planting has been boosted in Central America, as well as other crops, to levels never before attained.

Chile has been supplying some of the fertilizer needs of the Central American isthmus but due to poor transportation and the long distances the service hasn't been adequate.

The feeling in this area is that Mexico could become the leader in supplying fertilizers to the smaller nations of the isthmus.

Indication of the fact that Mexico is seriously thinking of becoming an exporter nation was the recent association of Productos Quimicos, S. A. (this firm founded 20 years ago has the largest electrolytic caustic soda plant existing in the Federal District) with the Dow Chemical Company, S. A., thus becoming a subsidiary of Dow.

In the new capitalization Mexican interests retained 50 per cent of the shares and the U. S. interests have the other 50 per cent. Jose Domingo Lavin is the new president of the merged firm.

According to unofficial reports, this merger is just one of the many planned in the future, as well as the wooing of foreign capital to expand Mexican fertilizer production. The eventual goal is to make Mexico self-sufficient and to have sizeable surpluses for export not only to Central America but South America also. This, it is admitted, is a long-term objective but work has already begun to make it a reality, perhaps in less than a decade.

Closely associated with current plans and providing more indication of things to come is the report of major finds of phosphoric rock deposits in two Mexican areas: the Carbonera zone of Nueva Leon and in the thickly wooded area around Santa Rosa in Zacatecas. These discoveries are specially important since phosphoric rock has never been located in Mexico before. Imports were made chiefly from Florida and Tennessee deposits. These new deposits are expected to provide enough of the basic material for Mexican needs.

According to Manuel Franco Lopez, mining engineer, the Santa Rosa deposits alone run to around six million tons with an average content of 18 to 20 per cent of phosphorous pentoxide. In Carbonera there is four million tons averaging 20 per cent phosphorous pentoxide.

While this is lower than the accepted mineral content for profitable exploitation, Lopez said special metallurgical processes will be used to up the percentage, principally by calcinating all mineral at temperatures of 1,100 degrees centigrade. The calcium oxide obtained from this process produces calcium hydroxide through the concentration process.

Lopez claims that this is the first time this process is being used to up low grade phosphoric rock minerals. In using this process, which increases the percentage content from 20 to 30 per cent, exploitation of the new finds will be possible.

The National Mining Development Commission has financed a pilot plant in Saltillo to test the process on an industrial scale. The entire project has been worked out by Mexican engineers and technicians.

So far the Commission has refused to report on the developments in industrial application, but has promised a comprehensive report later on in the year.

Teaching Farmers To Recognize Soil Insect Damage Is The Key To Increased Use Of Insecticides

FUTURE BRIGHT FOR SOIL INSECTICIDES

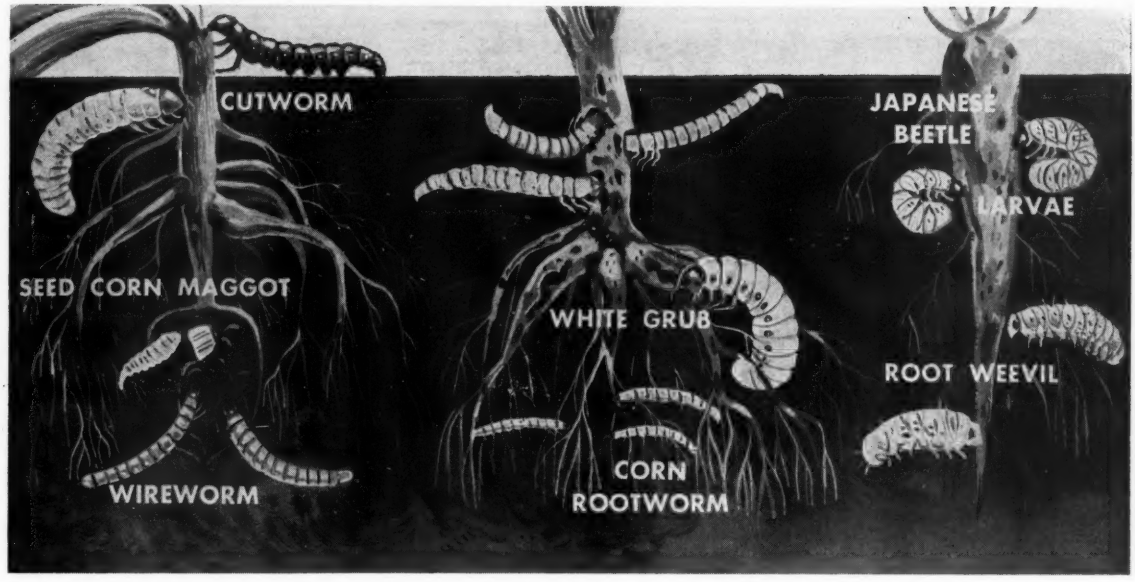
Dr. Roger W. Roth
Velsicol Chemical Corporation

CHEMICAL insecticides for soil treatment represent one of the most important post war developments in agriculture. In spite of their relative newness, they promise to undergo a tremendous increase in demand during the next few years. When we first marketed Heptachlor, we found the introduction of a soil insecticide was a twofold job. First, state and federal departments of agriculture had to thoroughly test the formulations offered. Second, farmers had to be made aware of the soil insect problem and the effectiveness of Heptachlor in combating it. After Heptachlor was introduced, there was a "wait and see" period of several years before general usage was initiated.

CONCEPT ESTABLISHED

Now, however, the concept of soil insect control has become firmly established. Taking the three leading corn producing states as examples, it is plain that soil insect control has become an important consideration in corn belt agriculture. In Iowa, 10,799,000 acres of corn were planted in 1956, and 1,200,000 of these acres were treated with soil insecticides. In Illinois, 8,180,000 acres were planted, and 370,210 acres treated. In Nebraska, the figures were 6,714,000 planted and 851,810 treated. Although the treated acreage is by no means overwhelming, it represents a percentage sizeable enough to prove that the soil insect problem is being recognized and combated by midwest farmers.

Concurrently, the figures show that the potential for soil insecticides is huge. All of these states lie within the area infested by corn rootworms, and the combined infestations of a number of different soil insects create an even more serious problem. Studies by entomologists indicate that soil insect infestations will increase in both area and intensity unless checked by insecticides, so that an increasing demand for these products is definitely indicated.



These are just a few of the soil insects that are causing trouble in the midwest corn producing states.

PRODUCTION INCREASED

In recent years, the use of soil insecticides has been greatly stimulated by the development of fertilizer-insecticide mixtures which enable farmers to control insects effectively and nourish the soil in one trip through the fields. Mixtures of this type were used on 59 per cent of the acreage treated in Iowa, and 51 per cent of the acreage treated in Illinois. So far, Nebraska has not officially recommended the mixtures, so usage figures in this state are insignificant. Even greater use of the mixtures will probably develop in coming years, when liquid fertilizer-insecticide mixtures are tested and made commercially available in quantity.

The use of liquid mixtures is still in its infancy in the leading corn states. This is the result, partially, of a formulation problem. Because of their high mineral content, formulations of this type have tended to lack stability. This problem is rapidly being overcome in the laboratory, however, and stable formulations will soon be available for testing. Once these tests are complete and recommendations made, liquid mixtures are expected to account for a large share of the soil insecticide market.

Another consideration that will influence the use of soil insecticides is the government's Soil Bank Program. With limitations on the amount of acreage that can be planted, farmers will turn to soil insecticides as a means of increasing yields from the land they are allowed to plant. This could also mean an increase in the use of fertilizer.

EDUCATION NEEDED

From all present indications, the future of soil insecticides looks bright. Increased usage, however, still depends on convincing the individual farmer that insects and their control are worth his time and money. In order to do this, the industry must maintain a strong continuing educational effort. Too often, farmers are unaware of the problem and blame the results of insect damage on other causes. To take one specific example, lodging of corn is often blamed on wind or rain, when the real cause is a soil insect infestation that has destroyed holding power. Our educational and service efforts must be vigorously pursued if we are to win the war against insects and realize our full market potential.

Corn rootworms, one of the most damaging types of soil insects in the midwest, are concentrated in these states. The three leading corn states are in solid black.

NAC

SPRING MEETING

MARCH 6, 7, 8, 1957

FAIRMONT HOTEL

SAN FRANCISCO

The need for more technically trained men and women to speed progress in agriculture will be highlighted during this spring meeting of the National Agricultural Chemicals Association.

The program is designed to bring into sharp focus the growing opportunities in all technical phases of agriculture, including the agricultural chemicals industry, and the need for encouraging young men and women to train for openings in industry and in government agencies allied to agriculture.

Probing into the economics of agriculture is another feature of this spring meeting. There will be discussion by top leaders on the importance of financing and credit to agricultural progress, and on the outlook for return on investment in the agricultural chemicals industry.

Another added highlight will be a section devoted to discussion on where growers and industry stand under the Miller amendment to the Food, Drug and Cosmetic Act.

●

PROGRAM

TUESDAY, MARCH 5

2:00 P.M. Board of Directors Meeting

WEDNESDAY, MARCH 6

VENETIAN ROOM

Mr. F. W. Hatch, NAC President, Presiding

9:30 A.M. Meeting Called to Order

WELCOME

Mr. A. F. Kirkpatrick, General Program Co-Chairman
Western Entmologist
Nitrogen and Allied Products Division
American Cyanamid Company
Oakland, California

REMARKS

Mr. C. O. Barnard, Executive Secretary
Western Agricultural Chemicals Association
San Jose, California

9:45 A.M. PRESIDENTIAL ADDRESS

Mr. F. W. Hatch, NAC President
Manager, Agricultural Chemicals Division
Shell Chemical Corporation
New York, New York

NAC's President takes a sharp and realistic look at the Industry's future.

10:15 A.M. MEN FOR AGRICULTURAL PROGRESS

Dr. S. B. Freebom, Provost
University of California
Davis, California

A prominent educator reports on the present and probable future supply of technically-trained manpower for agriculture and the agricultural chemicals industry.

10:45 A.M. MONEY FOR AGRICULTURAL PROGRESS

Mr. Earl Coke, Vice President
Bank of America
San Francisco, California

A former Assistant Secretary of Agriculture discusses the banker's interest in financing farmers' pest control program.

11:15 A.M. CREDIT FOR AGRICULTURAL PROGRESS

Mr. J. A. Walker, General Credit Manager
Standard Oil Company of California
San Francisco, California

A credit specialist stresses the contributions of a sound credit program to agricultural progress.

11:45 A.M. Adjournment

GOLD ROOM

6:00 P.M. Reception for Members and Guests. Admission by ticket only. Registration fee includes price of ticket. Additional tickets may be purchased for guests.

THURSDAY, MARCH 7

Committee Meetings as Scheduled
GOLF—Ocean Course, Olympic Club

FRIDAY, MARCH 8

VENETIAN ROOM

Mr. J. V. Vernon, NAC Vice President, Presiding

9:30 A.M. REMARKS

Mr. J. V. Vernon, President
Niagara Chemical Division
Food Machinery & Chemical Corporation
Middleport, New York

9:45 A.M. OUTLOOK FOR RETURN ON INVESTMENT IN TNE AGRICULTURAL CHEMICALS INDUSTRY

Mr. F. C. Shanaman, President
Pennsylvania Salt Manufacturing Company of Washington
Tacoma, Washington

A leading executive discusses what constitutes a proper return on investment and compares returns in the agricultural chemicals industry with returns in other phases of the chemical industry.

10:15 A.M. MAKING FEDERAL LEGISLATION WORK

Mr. J. T. Coyne, Assistant Head
Pesticide Regulation Section
Plant Pest Control Branch, A. R. S.
United States Department of Agriculture
Washington, D. C.

USDA reports on their label review program and its effect on the Industry.
Question and Answer Period

11:15 A.M. THE GROWING MARKET IN FOREST PEST CONTROL

(Speaker to be announced)

11:45 A.M. HOW NAC SERVES THE INDUSTRY

Mr. L. S. Hitchner, NAC Executive Secretary and NAC Staff Members

A graphic report on Industry problems and what NAC is doing to help solve them.

State Meetings

COLORADO

"Business looks good for the 1957 season in most fields—industry is expanding and many chemical companies are making plant expansions running into millions of dollars," Mr. D. L. Paterson of the Boettcher & Company told members of the Colorado Agricultural Chemicals Association at their 6th annual meeting held in Denver on January 25.

One of the highlights of the Colorado meeting was the report of the Colorado Agricultural Chemicals Clearing Committee. The committee under the chairmanship of Paul W. Swisher, Commissioner of Agriculture, and in cooperation with Colorado A. & M. College. presented the pesticide recommendations for the coming year. They listed only those pesticides that have federal approval and have proven to be successful in the state.

This type of session also gives industry, distributors and college personnel a chance to get together and discuss the recommendations and review results of research not only in Colorado but in other parts of the country as well.

During the meeting, new officers were elected. They are: Irwin C. Elliott, Chem-Agro Chemicals Corporation, **President;** Frank J. Randall, The C. D. Smith Co., **Vice-President;** and H. C. Hansen, General Chemical Division, **Secretary-Treasurer.** New directors are Harold Mankoff, Mannco Chemical Company and Mike Priola, Shell Chemical Company.

NEBRASKA

The Nebraska Fertilizer Institute Inc. sponsored a series of three dealer meetings last month. Total attendance at the three meetings was 175 dealers.

Featured speakers for the meetings were R. W. Allstetter, vice-president of the National Plant Food Institute; Mr. Mark Weldon and Dr. Leon Chesnin of the University of Nebraska and Mr. James Kenner, past president of the Nebraska Bankers Association.

Allstetter in his talk stressed the fact that too few dealers take the time to give their fertilizer program the economic analysis that it deserves, especially if it is operated along with some other phase of their business. He also pointed out to the dealers that farmers need to be reminded of the fact that even small yield increases mean large economic gains.

Kenner spoke on "What it Takes to Become a Fertilizer Dealer." He covered six points that a dealer should consider, and have, to make his operation successful: (1) Have a long-range aspect of the business future (2) Obtain maximum amount of help with a minimum of expense (3) Standardization of the inventory (4) Know your costs of operation—unit-wise and total (5) Removal of dead or slow moving stock (6) Persistance.

He also presented the results of a survey conducted by the Institute on "The Cost of Doing Business in Nebraska." The average cost for the dealer is $9.63 a ton he reported. This includes storage, taxes, selling costs, breakage, advertising costs, bad debts, contributions and inventory insurance. Kenner emphasized that if a dealer would take all of these factors into consideration he would think twice before getting himself involved in a "price-cutting" situation.

Weldon and Chesnin stressed the importance of trace elements in the soil. Their comments include a word of warning to manufacturers about labels on bags. They suggested that label should include instructions for use so that the farmer doesn't apply an amount that may be toxic to the plant.

ILLINOIS

About 600 custom spray operators, aerial applicators, farmers and industrial representatives attended the 9th annual Illinois Custom Spray Operators School held at the University of Illinois in January.

On the program were entomologists, agronomists and agricultural engineers from the Illinois College of Agriculture and the Illinois Natural History Survey, guest speakers from Kansas State College and Purdue University and commercial spray operators.

New officers elected for the Illinois Aerial Applicators Association were Bob Danforth, Monmouth, **President;** Les Gilbert, Arcola, **Vice-president;** and Lillard Heddon, Pekin, **Secretary-Treasurer.**

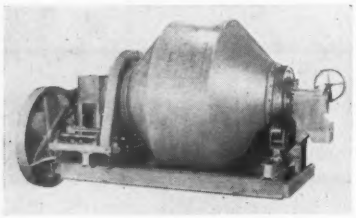
The Illinois Ground Sprayers Association also elected these new officers: Joe Garland, Dixon, **President;** Vernon Anderson, Newark, **Vice-president;** and A. E. Pickard, Mt. Vernon, **Secretary-Treasurer.**

FARM CHEMICALS
Equipment & Supplies

MUNSON MIXER BLENDS POWDERS & GRANULES

Both powders and granules can be blended in the Munson Rotary Mixer, according to its manufacturer, Munson Mill Machinery Co.

The mixers which are equipped



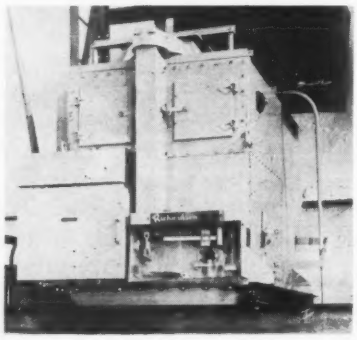
with an internal vent pipe to expell toxic fumes, will blend chemical compounds into a homogeneous, accurate mixture in a short time without reducing particle size.

Munson reports that the Rotary Mixer also can be used in coating granular fertilizers with insecticide dusts.

For more details,
CIRCLE 85 ON SERVICE CARD

TEST WEIGHINGS PASS ONE MILLION MARK

Test weighings on this new automatic fertilizer bagging scale have passed the one million mark with no mechanical or electrical



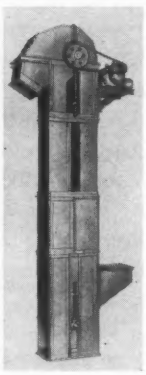
failure and no adjustment required, reports Richardson Scale Co.

Completely automatic, the HA-39 scale has been unattended during most of the five weeks of testing. At the one million point, it was making 28 weighings a minute.

For more information,
CIRCLE 86 ON SERVICE CARD

UH DESIGNS NEW BUCKET ELEVATOR

Universal Hoist Co. reports its new Model D Bucket Elevator has been designed for all dry, free-flowing materials. Capacity is from 1000 to 3000 bushels per hour.



Three different drives are available in all horsepower ranges as well as two-way or three-way valves, 6-way distributors and other accessories.

New catalogs with prices and complete specifications are available.
CIRCLE 87 ON SERVICE CARD

POWER-SHIFT ON HOUGH PAYLOADER

One of the features of the Frank G. Hough Co.'s Model HO Payloader tractor-shovel is complete power-shift transmission.

All shifts, up or down, are made with only one lever. There's no foot clutch and no stopping for a range shift. Shifting from forward to reverse also can be made under full throttle.

Rated carry capacity of the HO is 7,500 lbs. at 4 mph; lifting capacity—15,000 lbs.; and breakout force—21,000 lbs. Payload capacity is 2¼ yards; struck capacity—1¾yds.

For a bulletin giving complete specifications
CIRCLE 88 ON SERVICE CARD

BROOKS BULLETIN DESCRIBES FLOWMETER

Brooks Rotameter Co. has just published a bulletin describing its new VAF-Brooks positive displacement flowmeter. Suitable for hard-to-handle fluids, the meter is available in sizes from 1" to 6" or up to 450 GPM capacity. For a copy of the bulletin
CIRCLE 89 ON SERVICE CARD

SIDE-DUMP TRANSPORT FROM BAUGHMAN MFG.

A new side-dump transport, manufactured by Baughman Mfg. Co., unloads from individual buckets into truck-mounted spreader bodies and many other big heavy-duty bulk transport assignments.

The buckets can be raised or lowered by means of hydraulic rams, which are mounted on a monorail and moved into unloading position by a winch arrangement.

Controls are located on the side of the body, and operate either a P.T.O. or auxiliary engine drive for the hydraulic system.

Dumping height is approxi-

mately 103", with a per-bucket capacity of up to 6 tons, depending on weight and nature of material. For additional information
CIRCLE 90 ON SERVICE CARD

Suppliers' Briefs

Arkell and Smiths. Tom L. Jones is named director of multiwall sales. For the past year he has been vice president and eastern division sales manager.

Bemis Bro. Bag Co. Retirement of E. R. Bailey, manager of the San Francisco plant, after 52 years with Bemis recently was announced by Judson Bemis, executive vice president.

J. I. Case Co. Final consolidation of American Tractor Corp. into Case Co. was completed in January. Marc B. Rojtman, 39-year old former president of American Tractor, has been elected executive vice president and general manager of J. I. Case.

Chemical Construction Corp. Newly named assistant to the vice president is Carl A. Vill, a CCC employee since 1934.

Continental Can Co. New highs in both sales and earnings were attained in 1956. Combined net income after all charges equalled $43,143,000 and sales, $1,010,300,000.

Fulton Bag & Cotton Mills. The board of directors has elected Eugene B. DuBois as a vice president of the firm. DuBois is general sales manager of the Bag Div. which has its headquarters in New Orleans.

Haveg Industries, Inc. has announced the appointment of Guardian Chemical and Equipment Co. Ltd. of Montreal as sales representatives throughout Eastern Canada.

Hooker Electrochemical Co. reports record sales of $109,979,691 for the fiscal year ended Nov. 30, compared with $104,274,970 in the previous fiscal year. Net income amounted to $11,496,697, compared with $11,377,023 the preceding year.

CLASSIFIED ADVERTISING

NEW RATES . . .
Help wanted, positions wanted, used machinery and business opportunities are now charged at only 10 cents per word, $2.00 minimum. Count box number as five words.

Display ads . . . $15.00 per column inch, minimum of one inch. Ads over the minimum are accepted only in multiples of one half inch.

For prompt results, send your classified ads to Farm Chemicals, 317 N. Broad St., Philadelphia 7, Pa.

Closing date: 10th of preceding month

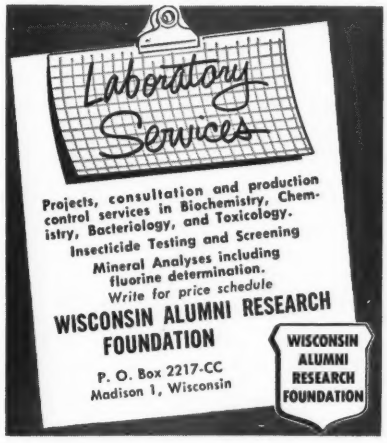
FOR SALE

FOR SALE: 3—Sprout Waldron size 12, style B horizontal ribbon mixers, 336 cu. ft. (10/12,000#) working capacity. Perry Equipment Corp., 1430 N. 6th St., Phila. 22, Pa.

FOR SALE: Aluminum Storage Tanks 2700 gal. to 23,000 gal. capacity. Perry Equipment Corp., 1430 N. 6th St., Phila. 22, Pa.

POSITION DESIRED

MANAGEMENT: Young college grad, personable and ambitious. Seeks challenging position in Agricultural Chemical Field. Strong Sales Background. Prefer Metropolitan New York Area. Address "585," care FARM CHEMICALS, 317 N. Broad St., Philadelphia 7.


Laboratory Services
Projects, consultation and production control services in Biochemistry, Chemistry, Bacteriology, and Toxicology.
Insecticide Testing and Screening
Mineral Analyses including fluorine determination.
Write for price schedule
WISCONSIN ALUMNI RESEARCH FOUNDATION
P. O. Box 2217-CC
Madison 1, Wisconsin
WISCONSIN ALUMNI RESEARCH FOUNDATION

International Paper Co. A. A. Scholl, manager of the Bagpak Div. announces appointment of Chester B. McCord as manager of manufacturing and Asa S. Morgan as assistant manager of manufacturing. Both men will headquarter at Camden, Ark.

Pressed Steel Tank Co. has created four product divisions in its Sales Dept.: LP-Gas Div., headed by Edward Elliott, Jr.; High Pressure Cylinder Div., headed by R. H. Dieckleman; Industrial Products Div., T. V. Montgomery; and Tank and Container Div., R. A. Hirst.

St. Regis Paper Co. reports that its sales and net income for 1956 reached record levels for the company. A preliminary statement indicates net sales at about $330,000,000 and profit from operations of approximately $46,700,000.

Sprout-Waldron & Co., Inc. C. Donald Fisher has been named to the new post of director of research and development.

Trent Tube Co. has announced completion of plans for the opening of a second plant to manufacture welded stainless steel and high alloy tubing and pipe. The new operation will be located at Fullerton, Calif., in the Los Angeles area.

Witco Chemical Co. H. Russell Spielman recently was named manager of the Technical Service Dept.

Yale & Towne Mfg. Co. has appointed Harold M. Stiles western regional sales manager of the Yale Materials Handling Div.

by Dr. Melvin Nord

PATENT REVIEWS

FUNGICIDES

U. S. 2,763,962, issued Sept. 25, 1956 to John L. Hardy and assigned to The Dow Chemical Co., discloses the use of bromonitromethane as a fungicidal fumigant for controlling soil-inhabiting fungi which attack the underground parts of plants.

U. S. 2,765,254, issued Oct. 2, 1956 to Albert A. Somerville, assigned to R. T. Vanderbilt Co., Inc., describes a method for use in the control of scab on apple trees, with manganous dimethyldithiocarbamate as the fungicide. The color of this material is light tan, and it does not leave an unsightly residue on the foliage and fruit.

U. S. 2,767,114, issued Oct. 16, 1956 to Ewald Urbschat and Paul-Ernst Frohberger, assigned to Farbenfabriken Bayer Aktiengesellschaft, discloses the use of arsenate salts of monothio acids as seed disinfectants.

U. S. 2,767,173, issued Oct. 16, 1956 to Leon Katz and assigned to Schenley Industries, Inc., discloses the use of thiosalicylhydrazide compounds as bactericidal and fungicidal compositions.

HERBICIDES

U. S. 2,765,224, issued Oct. 2, 1956 to Joseph A. Lambrech and assigned to Union Carbide and Carbon Corp., discloses the use of esters of 2-(2,4-dichlorophenoxy) ethanol (e.g. with benzoic acid or "naphthenic acids" recovered from petroleum).

U. S. 2,767,071, issued Oct. 16, 1956 to Henry L. Morrill and assigned to Monsanto Chemical Co., discloses an herbicidal composition consisting of the dimethylamine salt of 2,4-D. The object is to provide compositions which have low solution points at relatively high concentrations.

SOIL CONDITIONING

U. S. 2,763,961, issued Sept. 25, 1956 to Ernst Trommsdorff and Theodor Volker, assigned to Rohm & Haas G.m.b.H., provides a method for improving the tilth of agricultural soil, which consists of applying to the soil a sodium salt of a copolymer having a molecular weight of at least 300,000 of acrylic acid and a polymerizable unsaturated monomer (e.g. methyl methacrylate). It is found, contrary to expectation, that molecular weights above 300,000 provide much better soil-agglomerating ability than lower molecular weight polymers.

The relative proportions of acrylic acid and the polymerizable monomer are such that the calcium salt of the copolymer has the maximum solubility in water.

U. S. 2,765,290, issued Oct. 2, 1956 to George E. Ziegler and assigned to Zonolite Co., discloses a method of soil-conditioning with exfoliated particulate vermiculite and sodium polyacrylate having a molecular weight of at least 50,000.

U. S. 2,765,291, issued Oct. 2 1956 to Frederick F. Horne discloses the use of pumice as an extender for soil-conditioning agents such as Krilium.

U. S. 2,767,072, issued Oct. 16, 1956 to Henri Coanda, describes a method of producing a soil regenerating substance, which contains biotic factors and selected cultures of micro-organisms. The biotic factors are extracted from the interior of the paunches of ruminants, from fecal matter and urine, and from green vegetation. The micro-organisms are microbe cultures made in the laboratory, and include nitrogen-fixers, oxidizers of ammonia, and cellulose ferments.

INSECTICIDES

U. S. 2,765,252, issued Oct. 2, 1956 to Max Pianka and assigned to The Murphy Chemical Co. Ltd., discloses synergistic bis-(dimethylamino)-fluorophosphine oxide insecticidal compositions.

U. S. 2,765,253, issued Oct. 2, 1956 to Peter L. de Benneville and Lawrence J. Exner, and assigned to Rohm & Haas Co., discloses a method of controlling thrips on plants, by using tert.-butylcyanomethyl cyanamide as an insecticide.

U. S. 2,765,255, issued Oct. 2, 1956 to Thomas Swarbrick and assigned to Shell Development Co., discloses a method of preparing flowable paste concentrates which are easily diluted with water to form sprayable insecticide compositions. Finely divided solid insecticide (e.g. DDT) is suspended in an intimately mixed liquid dispersion of water in a water-insoluble organic liquid, the organic liquid being the continuous phase. Such a concentrate remains stable and easily pourable even after long periods of storage, and is very readily diluted with water for ultimate application.

U. S. 2,766,165-2,766,169, issued Oct. 9, 1956 to Albert H. Haubein and assigned to Hercules Powder Co., describe a number of insecticidal thiophosphate compounds. U. S. 2,766,171 (same date and assignee) by William R. Dively, and U. S. 2,766,172 (same date and assignee by Rhoads M. Speck, provide additional compounds of this type.

U. S. 2,767,115, issued Oct. 16, 1956 to Abner L. Schultz and Robert R. Bloor, assigned to The B. F. Goodrich Co., discloses the use of chlorinated turpentine hydrocarbons in insecticidal compositions.

. . . Patents

U. S. 2,768,111, issued Oct. 23, 1956 to Harry S. Butler and Clarrence C. Harvey, Jr., and assigned to Ethyl Corp., discloses emulsifiable concentrates of chlorinated insecticides.

FERTILIZERS

U. S. 2,766,107, issued Oct. 9, 1956 to Donald H. White and assigned to Phillips Petroleum Co., describes a process for producing a granular mixed fertilizer containing urea, acid anhydrides and ammonia.

The melt of urea with about 20 per cent water is taken directly from the urea production process and is contacted with an acid anhydride such as SO_3, producing a melt consisting of urea and the corresponding acid (i.e. H_2SO_4). This melt is cooled and then contacted with anhydrous ammonia, producing the corresponding ammonium salt (e.g. $(NH_4)_2SO_4$). This melt is then cooled to 20–40° F above the temperature at which the entire melt remains solid, and is then dispersed in a cool gas in a spray tower, thus producing smooth, hard globular granules which are uniform in size and have excellent drilling properties.

U. S. 2,766,283, issued Oct. 9, 1956 to Eugene T. Darden and assigned to E. I. du Pont de Nemours & Co., describes a process for preparing urea-formaldehyde fertilizer compositions in which the nitrogen content becomes available gradually and over a long period of time.

U. S. 2,766,880, issued Oct. 16, 1956 to Franz Schaub and Heinrich Tramm, assigned to Ruhrchemie Aktiengesellschaft, describes a process and apparatus for the de-dusting and particle-size classification of fertilizers.

U. S. 2,766,883, issued Oct. 16, 1956 to Otto C. Chapman and Arnold W. Dean, assigned to Virginia-Carolina Chemical Corp., describes a process for deoiling the rougher phosphate concentrate produced in the first step of the double float process.

U. S. 2,767,045, issued Oct. 16, 1956 to Robert F. McCullough and assigned to the United States Atomic Energy Commission, describes a process for production of dicalcium phosphate from phosphate rock, and the recovery of uranium values.

U. S. 2,767,046, issued Oct. 16, 1956 to Robert J. Piros, Jr. and assigned to the United States Atomic Energy Commission, describes a process for the recovery of uranium and phosphate values and high purity alumina from the leached zone layer and the phosphate matrix layer found in the Florida Pebble Phosphate Field.

SOIL STERILIZATION

U. S. 2,766,554, issued Oct. 16, 1956 to Stephen C. Dorman and August B. Lindquist, Jr., and assigned to Stauffer Chemical Co., describes a method of temporarily sterilizing soil with sodium N-methyl dithiocarbonate or similar compounds.

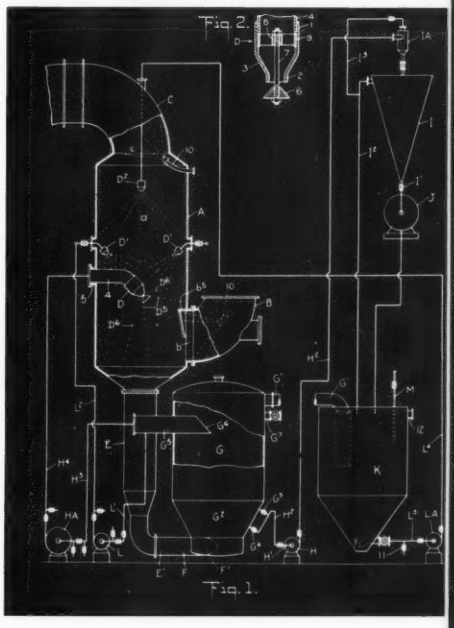
PRODUCING AMMONIUM SULFATE

U. S. 2,759,796, issued Aug. 21, 1956 to Carl Otto, describes an improved process for producing ammonium sulphate from coke oven gas, which may be described as the "liquor and crystal spray dispersion method."

The method of carrying out the process is shown in Fig. 1. A represents a scrubber, into which coke oven gas enters at B, and from which it leaves at C. Liquor containing small crystals of ammonium sulphate is sprayed in through spray nozzles D and D^1, leaves through the bottom outlet E, and runs tangentally into the bottom of tank G. Additional liquor free of crystals is also sprayed into the top of the scrubber through nozzle D^2. The centrifugal action created in tank G causes the larger crystals to separate at the bottom of the tank.

Crystallization of the supersaturated liquor leaving the scrubber A occurs partly in the outlet pipe E and partly in tank G, the entrained crystals acting as nuclei for crystal growth. Thus, tank G acts as a crystallizer and classifier, the conditions being such that the smaller crystals are at the top and the larger crystals at the bottom. The larger crystals are withdrawn as a slurry from the cone G^2, by means of pump H which pumps the slurry through a cyclone separator IA and into the settling tank I. Crystals withdrawn from the bottom of tank I contain a small amount of liquor, which is removed in centrifuge J. Overflow liquor from tank I and from the cyclone separator IA drops into tank K, and is then recycled to the top spray nozzle D^2 of the scrubber.

Liquor containing small crystals of ammonium sulphate overflows the top of tank G and is recycled to the scrubber A through nozzles D and D^1. Nozzles D^1 and D^2 may be commercially available, non-clogging nozzles. The design of nozzle D is shown in Fig. 2.



Chemicals

APPLE SPRAYS MAY UPSET NORMAL BALANCE

Sprays applied year after year to control apple pests apparently upset the normal balance of insects and mites in the orchard, according to a report from the Connecticut Agricultural Experiment Station.

Philip Garman of the Connecticut station recently reported his 1956 observations based on careful examination of the ground cover and bark of the lower trunk in several apple orchards. He finds a remarkable increase in the number of beetle mites following use of methoxychlor and malathion combinations in the spray mixture. This observed 10-fold increase as compared with areas sprayed with lead arsenate may greatly change the food supply of some mite predators, according to Garman.

Number of two-spotted mites was materially lower where lead arsenate was used as an insecticide as compared with methoxychlor. Thrips that feed on mites were least abundant where two-spotted mites were most numerous.

Dr. Garman's continuing study of the mite problem in orchards shows that the indirect effect of insecticide sprays on mites may vary widely. One reason for these differences is that more than one type of mite and its enemies is involved, the report states.

CLIMAX ADDS SODIUM MOLYBDATE TO ITS LINE

Climax Molybdenum Co. reports it now is supplying sodium molybdate and has stocks available to meet anticipated needs of fertilizer manufacturers, farm chemicals distributors and other industrial consumers. Available as crystalline technical grade, the product assays 97.0 per cent minimum sodium molybdate dihydrate ($Na_2MoO_4 \cdot 2H_2O$) and 38.4 per cent minimum molybdenum.

George L. Innes, Climax manager of chemical sales, said the firm's principal reason for marketing sodium molybdate is the growing agricultural demand for it, particularly in the Pacific Northwest.

NEW FUNGICIDE IS DEVELOPED BY CORONA

Development of a new all-purpose economical pre-cover fungicide to control major apple diseases in the fruit growing industry has been announced by Corona Chemical Div., Pittsburgh Plate Glass Co.

To be known as Phybam-S, the product has been field-tested by many state experiment stations. Wide scale trial marketing with careful follow-up of fruit yield and finish has established the new fungicide as an outstanding performer in controlling apple diseases such as cedar rusts, scab and powdery mildew, according to Corona.

USDA ADVISES FARMERS TO TRY NEMATOCIDES ON SMALL SCALE AT FIRST

Nematocides can increase yields and quality of tobacco and vegetable crops by 25 per cent or more, say USDA scientists. But because nematocide treatments are expensive, the department advised that farmers try them on a small scale first, before making any substantial investment.

A. L. Taylor, nematologist at USDA's Agricultural Research Center, Beltsville, Md., recommends that nematocides be tested in fields that will be planted to high-value crops.

Broadcast treatment with a nematocide costs $30 to $50 an acre, USDA continues. If used for a $300 to $500 per acre crop, a nematocide should increase growth and yield enough to raise the value of the crop by $100 to $150 per acre. Since row treatments cost about half as much as the broadcast method, it may pay farmers to apply nematocides in this way for crops selling at $200 an acre. Treatments are of doubtful value, says the Agriculture Department, for crops selling under $200.

Nematocides used for large-scale field treatment include DD mixture (dichloropropene-dichloropropane), EDB (ethylene dibromide) and dibromo-chloropropane.

Special nematocides, such as methyl bromide and chloropicrin are recommended for seedbeds, greenhouses, nurseries and other areas of high-value soil. They cost $6 to $10 per 100 square feet, or $300 to $500 an acre.

TWO SYSTEMICS FOR CATTLE GRUB CONTROL

The search for a chemical that can be given to cattle orally or by spraying to destroy cattle grubs inside the animal body has turned up two insecticides that may be just what scientists and livestockmen have been looking for, USDA reports.

Most promising is said to be Dow ET-57, a phosphate compound given orally to cattle by mouth as a drench or in a large cylindrical pill. It dissolves and passes through the walls of the digestive tract, quickly circulating in body fluids to all parts of the animal.

The other systemic that has performed well against cattle grubs in preliminary tests is Bayer 21/199. Also a phosphate compound, this chemical is administered by spraying over the animal.

Neither chemical is now available commercially, and they are not yet recommended for cattle-grub control. Additional research is needed—on their possible toxic effects on treated animals, or whether they leave any toxic residues in meat or milk, and on practical methods and timing of treatments.

PEST REPORTS

Presented in cooperation with the Economic Insect Survey Section, Plant Pest Control Branch, Agricultural Research Service, USDA.

BORER HIBERNATION POPULATION DOWN

THE number of European corn borers in hibernation this winter is lower than last year, according to a survey conducted by state agricultural agencies in 27 of the more important corn states this past fall. Counts dropped from 147 per 100 stalks in 1955 to 105 in 1956.

In the North Central states, the decrease was from 173 borers per 100 stalks to 98. In some of these states, less than half as many borers were recorded as last year. Illinois dropped from an average of 285 in 1955 to 127 in 1956. Indiana decreased from 172 to 97. Iowa continued to drop from 497 in 1954 to 351 in 1955 to 220 in 1956. Persistent drought conditions have contributed toward the continued decline in corn borer populations in this area.

In contrast with the declining numbers in the North Central area, all of the 13 Eastern states surveyed, except Maryland and New Hampshire, showed increases over last year. The borer average in this group of states rose from 75 per 100 stalks to 130. The overall decrease in the corn borer population does not necessarily mean a corresponding decrease in the amount of damage from this serious pest during the 1957 crop year. The severity of the winter and weather conditions next spring and summer will have important bearing on development of infestations during 1957.

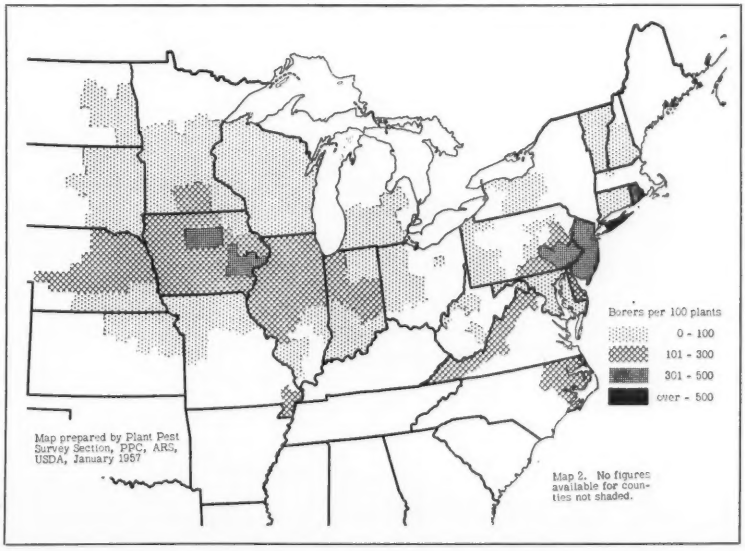
Heaviest concentrations of borers were found on Long Island, New York, in Rhode Island, New Jersey, southeast Pennsylvania, and eastern and central Iowa. (See abundance map.) Long Island's Suffolk county reported 1089 borers per hundred stalks of corn, which was the highest population of any county reporting.

Perhaps in connection with the high population in that county was the unusual occurrence of the pest there in potato tubers. The light general infestation lasted only a short time but during the period all Long Island potatoes moving for export were fumigated with methyl bromide.

The borer also attacked potatoes in some eastern North Carolina areas causing severe damage, but as far as known this injury was confined to the potato plants.

This introduced insect, which was first found in this country near Boston, Massachusetts in 1917, was not found in any new states this past year; however, it was found in 37 new counties within four of the 37 infested states. New county records were as follows: Mississippi 28, Arkansas 7, Alabama 1 and South Dakota 1.

EUROPEAN CORN BORER ABUNDANCE, FALL, 1956


Borers per 100 plants
0 - 100
101 - 300
301 - 500
over - 500
Map prepared by Plant Pest Survey Section, PPC, ARS, USDA, January 1957
Map 2. No figures available for counties not shaded.

LIVESTOCK PESTS REPORTED ACTIVE

Cattle grub surveys in Arkansas show lower numbers per animal than in January 1956; 2.2 compared with 8.4. Counts in Oklahoma average about 4 per animal in some areas. Averages in Ellis and Riley counties, Kansas, ranged from 1.8 to 2.7. Of cattle inspected in Palm Beach county, Florida, in early January, 95 were infested with average of 11 grubs.

Sheep scab mite was reported in sheep in some flocks in Virginia and Iowa. The affected animals were dipped in all cases.

Cattle lice have been serious in several areas of Utah with more

than 5000 head of cattle treated in Millard county of this state. The cattle tail louse has become a serious pest of cattle in Wilkinson county, Mississippi.

SPOTTED ALFALFA APHID STATUS IN 1956

Spotted alfalfa aphid continued its rapid spread across the United States in 1956 (see map). The destructive pest, which was found in New Mexico in the spring of 1954, reached Mississippi River by the end of 1955 and in early 1956 it was collected in northern Florida. As of January 1, 1957, the aphid was known in 30 states.

In answer to a recent questionnaire, most of the more heavily infested states indicated that wind was the primary agent of spread within their areas. Mild weather conditions during late fall and early spring and overlapping of alfalfa crops in some of the southern areas were among other factors listed as contributing to spread and development of infestations.

The cost of alfalfa production in the states hardest hit by the pest has increased considerably. It was estimated that additional costs amounted to as much as $7.50 per ton of hay in treated areas, depending on number of treatments required and the percentage of the crop lost.

Cost estimates by states were as follows: New Mexico $.75–4.50, Utah 1.50–2.00, Nevada 2.00, Oklahoma 7.50, Arizona 2.50, Arkansas 2.00–2.50. Missouri showed estimates of $1.50–1.75 per ton for increased costs from spotted alfalfa aphid and pea aphid infestations combined. California listed additional costs of $1.75 to 3.00 per acre treated.

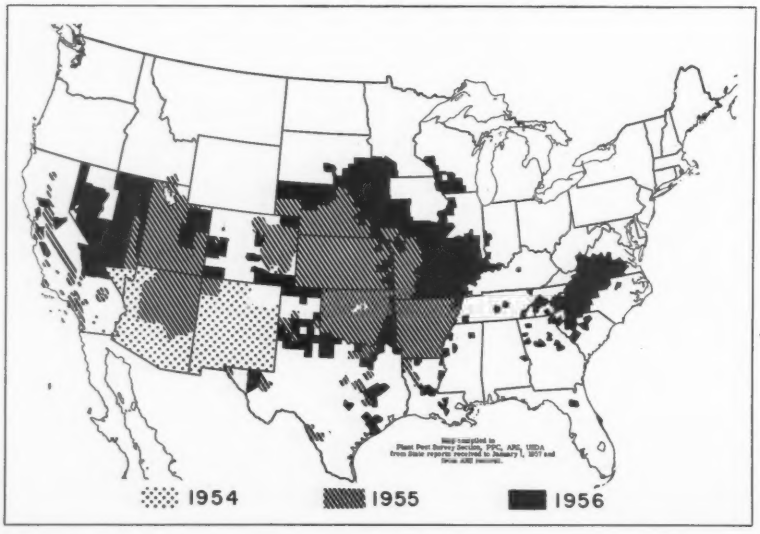
The principal materials used to control the aphid on alfalfa hay crops were reported to be malathion and parathion.

Although the impact of this pest on alfalfa production has been widely felt, there has been only a slight reduction in alfalfa acreage in most states due to the aphid alone. Oklahoma, however, reported a considerable reduction. A fifty per cent reduction in acreage in Texas was due to a combination of drought and aphid damage.

Precisely what part drought conditions played in the overall alfalfa loss figures cannot be ascertained, but crop losses in Texas and Kansas were attributed to the combination of drought-aphid damage. These losses were estimated at six million dollars in the former state and 8½ million in the latter in 1956. Losses caused by the spotted alfalfa aphid in 11 western and southwestern states were estimated at about 41,800,000 dollars in 1956, compared with 34,400,000 dollars in 1955. In 1954, the first year of infestations, losses were estimated at almost 5 million dollars.

Research results have been very encouraging in showing ways to live with this destructive invader. Satisfactory chemical control measures are being employed, biological control efforts are under way and alfalfa resistance studies are showing promise. Natural enemies such as insect predators and fungus diseases have benefitted the grower considerably in his fight against the aphid. California reports promising results from imported wasp parasites.

SPREAD OF SPOTTED ALFALFA APHID



OTHER INSECT SURVEYS

Fall alfalfa egg survey in New Jersey showed 72 per cent of alfalfa fields in the state have infestation compared with 42 in fall of 1955. Average number of egg clusters is more than 2 per 100 stems. Based on these findings, it appears that all alfalfa acreages in the state may need to be treated for the pest in 1957. Egg surveys for another pest, the meadow spittlebug, in New Jersey indicate that infestations are expected to be low in legumes this coming season. Small grain pests have not been reported in unusual numbers this winter.

MITE SURVEY REPORTS

In early February, a survey in 20 central Texas counties showed the winter grain mite as generally light over the area. Light infestations of this mite, brown wheat mite and army cutworm have been reported from some Oklahoma counties.

Two-spotted spider mites were requiring control on strawberries in lower Rio Grande Valley of Texas. Cole crops were heavily damaged in some Georgia and South Carolina counties by the vegetable weevil. ▲

Statistics

MIXED FERT. SALES UP 6% IN KENTUCKY

Increases are reported in tonnage of both mixed fertilizers and total fertilizers sold in Kentucky during calendar 1956 and a decrease is noted in tons of straight materials, according to the State Department of Feed and Fertilizer.

Mixed fertilizer tonnage in the state during 1956 was 440,000, an increase of almost 6 per cent over that sold in 1955. Leading grade was 4-12-8 (94,719 tons), followed by 5-10-15 (83,466 tons). 3-9-6, which led all other mixed goods in tonnage during 1956, has dropped to ninth place.

Straight materials tonnage amounted to 92,000 tons, a decrease of 11 per cent from the previous year's sales. While an 11 per cent increase in sales of nitrogen materials is reported for 1956, phosphate and potash materia s decreased 18 and 11 per cent respectively.

Sales of all fertilizer—532,000 tons—represents an increase of a little more than 2 per cent over the tonnage recorded for the previous year.

SUPER SHIPMENTS DOWN STOCKS INCREASE 2%

During November, shipments of superphosphate and other phosphatic fertilizers totaled 145,453 tons, a decrease of 2 per cent from the volume shipped during the previous month.

Stocks on hand during the month increased 2 per cent, and the November 30, 1956 stocks were 20 per cent higher than the quantities held by phosphatic material producers on November 30, 1955.

CENSUS COMPARES 1879 AND 1954 FERT. SALES

American farmers now spend 35 times as much each year for commercial fertilizer as they did 75 years ago when the Census of Agriculture first collected information on expenditures for fertilizer.

In 1954, according to the last Census of Agriculture, farmers spent nearly $1.1 billion for fertilizer. In 1879, farmers spent about $28.6 million for plant foods.

The census showed that fertilizer was applied to 46.5 million acres of corn, 11 million acres of wheat, 9.7 million acres of cotton and 6.3 million acres of fruits, vegetables and potatoes. Applications also were made to 13 million acres of hay and cropland pasture and 4 million acres of improved pasture other than cropland pasture.

Production — November, 1956

Compiled from Government Sources

Chemical	Unit	November 1956	November 1955	October 1956
Ammonia, synth. (anhydrous)	s. tons	[1]264,458	268,859	*272,708
Ammonia liquor, coal & coke (NH_3 content)	pounds	3,144,504	3,089,500	3,247,732
Ammonium nitrate, fert. grade (100% NH_4NO_3)	s. tons	142,415	153,595	*137,766
Ammonium sulfate				
synthetic (technical)	s. tons	[1]82,001	92,285	*94,745
coke oven by-product	pounds	155,376,409	162,721,200	160,834,749
BHC (Hexachlorocyclohexane)	pounds		3,477,570	6,112,666
Gamma content	pounds		628,392	1,011,709
Calcium Arsenate	s. tons	[2]	[2]	[2]
Copper sulfate (gross)	s. tons		6,748	4,952
DDT	pounds		10,310,389	10,948,824
2,4-D Acid	pounds	———	2,932,820	———
esters and salts	pounds	———	2,530,132	1,767,307
esters and salts (acid equiv.)	pounds	———	1,819,501	1,371,666
Lead arsenic (acid and basic)	s. tons	[2]	938	[2]
Phosphoric acid (50% H_3PO_4)	s. tons	279,192	298,313	320,709
Sulfur, Native (Frasch)	l. tons	514,772	537,461	529,056
recovered	l. tons	39,580	35,000	40,750
Sulfuric acid, gross (100% H_2SO_4)	s. tons	1,314,675	1,417,701	*1,360,546
Superphosphate (100% APA)	s. tons	207,612	216,397	*207,107
Normal (100% APA)	s. tons	132,398	147,475	*124,285
Enriched (100% APA)	s. tons	[2]	1,953	[2]
Concentrated (100% APA)	s. tons	58,855	66,025	65,215
Wet Base (100% APA)	s. tons	[2]	944	[2]
Other phos. fertilizers	s. tons	14,644	15,543	15,533
2,4,5-T Acid	pounds	———	———	433,691
Urea	pounds	———	———	70,097,979

* Revised. [1] Includes quantities for 1 plant previously not reporting. [2] Withheld to avoid disclosing figures for individual establishments.

Fertilizer Materials Market

New York

February 20, 1957

Sulfate of Ammonia. While most producers noticed a better demand for nearby shipment, stocks on hand were large for this time of year and demand for export was rather spotty. No changes in price were noted.

Ammonium Nitrate. Producers were shipping against contracts and while shipments were picking up in the last 30 days, producers felt the peak demand would be late this year.

Urea. Domestic material was available at several points with very little imported material arriving in recent weeks.

Nitrogenous Tankage: With the current market quoted at from $3 to $4 per unit of ammonia ($3.64 to $4.86 per unit N), f.o.b. various production points, a better demand expected for over the next 30 to 60 days.

Castor Pomace. As one large producer was forced to shut down, due to lack of raw materials, there are no offerings of this material, with last sales made on the basis of $45.50 per ton, f.o.b. production points.

Organics. Buyers were showing more interest in organic fertilizer materials for nearby shipment because of the approach of the heavy shipping season. Last sales of dried blood were made at $5.50 per unit of ammonia ($6.68 per unit N), f.o.b. Eastern production points, and tankage sold at $5 ($6.08 per unit N), f.o.b. the East. Soybean meal fluctuated between $46 and $47 per ton in bulk f.o.b. Decatur, Ill. Cottonseed meal was well sold ahead but stocks were available at various points. Linseed meal was rather dull in tone with little interest from export buyers.

Fish Meal. Stocks were ample at most points and demand was rather poor, particularly from the feed trade. Last sales of fish scrap were made at $137 per ton, f.o.b. fish factories, and fish meal sold at $143 per ton. It looks as though some stocks will be carried over into the new fishing season unless demand picks up.

Bone Meal. A better demand was noted both from the fertilizer and feed trade with last sales at $60 per ton, f.o.b. domestic production points. Imported feeding bone meal at Southern ports commanded a premium, with sales being made at $75 per ton, f.o.b. port.

Hoof Meal. A fairly good demand was reported from industrial users of this material with last sales on the basis of $5.75 per unit of ammonia ($6.99 per unit N), f.o.b. Chicago. Fertilizer demand was rather poor.

Superphosphate. Material was reported moving fairly well at most points but supplies were large in most cases. One small producer of triple superphosphate advanced the price slightly because of increased freight charges on raw materials.

Potash. Producers were shipping against existing contracts and the market was a rather routine affair with no price changes noted.

Philadelphia

February 20, 1957

Inventories of fertilizer chemicals continue very large and orders from mixers are somewhat slower than normally. Organics are in quite short supply. Castor pomace is practically unobtainable, and blood and tankage are both higher than in our last report.

Sulfate of Ammonia. Movement is disappointing and supplies in producers hands keep accumulating. It is still listed at $32 per ton in bulk.

Ammonium Nitrate. Inventories are large, with production ahead of demand, which is not up to seasonal expectations. No price change is reported.

Nitrate of Soda. The situation in this material is regarded as fairly satisfactory and about normal. Prices remain without change.

Blood, Tankage, Bone. Supplies are not too plentiful and blood and tankage are in much stronger shape than indicated in our previous report. Both commodities are presently quoted at $6.25 per unit ammonia ($7.59 per unit N), in the Chicago area, while in New York area blood is priced at $5.50 ($6.68 per unit N) and tankage at $5 per unit ($6.08 per unit N). Bone meal continues to be listed at $60 per ton for the fertilizer grade, and as high as $72.50 to $75 for feeding grade. Nitrogenous tankage is offered at $3 and up per unit ammonia ($3.64 per unit N), in bulk at producing plants.

Fish Scrap. Supply is limited and market quiet. Domestic production of menhaden, while lower than last year in an equivalent period, is offset by increased imports. Present quotations are $137 per ton for scrap and $140 per ton for menhaden meal.

Superphosphate. Prices are without any indicated change. Inventories of normal grade, while quite large, are not too much over similar period the previous year.

Castor Pomace. This is practically unobtainable at present, and there is consequently no market.

Potash. While the use of potash is said to be gradually increasing, the movement continues below normal expectancy and stocks are piling up. Prices remain unchanged.

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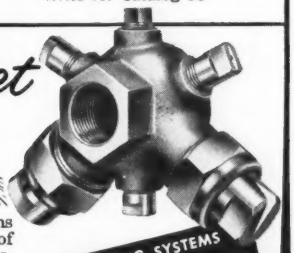

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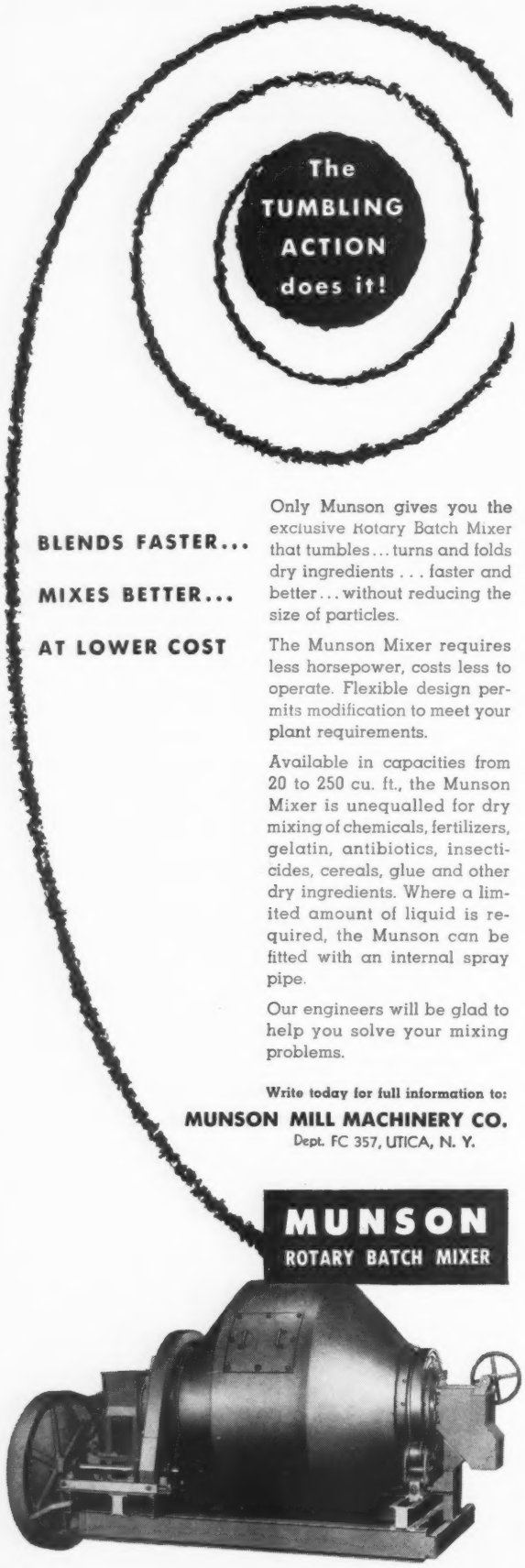
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INCREASED USE OF FERTILIZER AND CHEMICALS PREDICTED FOR 1957

AMERICAN farmers will buy one million more tons of fertilizer in 1957 than they did in 1956, according to a nationwide survey conducted by the Doane Agricultural Service, Inc. This will represent a 4.7 per cent increase in fertilizer consumption this year compared to last year.

This survey also showed that 1.5 million farmers will use some type of agricultural chemicals in 1957. This represents a 1 per cent increase over last year.

On a regional basis, the survey shows the greatest increase in the use of fertilizer will be in the South Central Region, followed by the East North Central and the North Atlantic Region. A decrease is expected to occur in the West North Central and Western Regions because of a combination of drouth conditions, carryover of fertilizer, acreage controls and the Soil Bank.

Generally speaking the use of chemicals will be up in all regions. The exceptions are the South Central region which will be down 41 per cent in the use of chemicals in crop insect control and the South Atlantic Region which will be down about 5 per cent in the use of post-emergence weed sprays.

This survey was conducted through Doane's Countrywide Farm Panels, representing a cross-section of the nation's 2,100,000 full-time farm families.

FERTILIZER PLANS FOR 1957

Region	Per cent Change
North Atlantic	7.9
South Atlantic	3.8
South Central	14.7
East North Central	8.9
West North Central	4.3
Western	9.8
United States	4.7

CHEMICAL PLANS FOR 1957

Type of Chemical	Per cent Planning to use in 1957	Per cent Increase*
Pre-emergence weed sprays	13	36
Post-emergence weed sprays	42	7
Brush Killer weed sprays	21	25
Insect control on crops	41	3
Insect control on livestock	55	same

* 1956 over 1957

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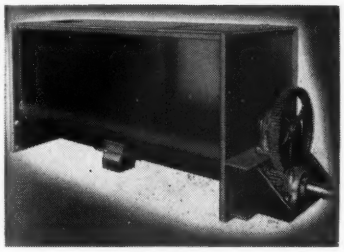

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African Pyrethrum, New York City 18
American Agricultural Chemical Co., New York City ..... —
American Cyanamid Co., New York City ..... —
American Potash & Chemical Corp., Los Angeles, Calif. ..... —
Armour Fertilizer Works, Atlanta, Ga. ..... —
Ashcraft-Wilkinson Co., Atlanta, Ga. ..... 16, Back Cover
H. J. Baker & Bro., New York City ..... —
Baughman Mfg. Co., Jerseyville, Ill. 20, 21
Blue Valley Equip. Mfg. & Eng. Co., Topeka, Kans. ..... —
Bradley & Baker, New York City ..... —
Bradley Pulverizer Co., Allentown, Pa. 23
Burlap Council, New York City 3
Chase Bag Co., Chicago, Ill. ..... —
Clark Equipt. Co., Benton Harbor, Mich. 41
Clover Chemical Co., Pittsburgh, Pa. ..... —
E. D. Coddington Mfg. Co., Milwaukee, Wis. ..... —
Cole, R. D. Mfg. Co., Newnan, Ga. ..... —
Commercial Solvents Corporation, New York City 11
Crowley Tar Products Co., New York City ..... —
Davison Chemical Co., division of W. R. Grace & Co., Baltimore, Md. 39
Duval Sulphur & Potash Co., Houston, Tex. 16
Edwards Laboratory, Norwalk, Ohio ..... —
Escambia Chemical Corp., Pensacola, Fla. ..... —
Exact Weight Scale Co., Columbus, Ohio ..... —
Finco, Inc., North Aurora, Ill. ..... —
Dave Fischbein Co., Minneapolis, Minn. ..... —
Geigy Agricultural Chemicals, New York City ..... —
Grand River Chem. Div., Deere & Co., Tulsa, Okla. ..... —
Highway Equipment Co., Cedar Rapids, Ia. ..... —
Hough, The Frank G. Co., Libertyville, Ill. 8, 9
Hudson Pulp & Paper Corp., New York City ..... —
Indian Jute Mills Association, New York City 3
Industrial Marking Equipment ..... —
International Mineral & Chemicals Corp., Chicago, Ill.
Spec. Prod., Phosphate Chemicals Div. 4, 5
Phosphate Minerals Div. 32
Potash Div. 64
Jackle, Frank R., New York City ..... —
Joy Manufacturing Co., Pittsburgh, Pa. 24
Keim, Samuel D., Philadelphia, Pa. 67
Kraft Bag Corporation, New York City 27
Link-Belt Co., Chicago, Ill. ..... —
Ludlow-Saylor Wire Cloth Co., St. Louis, Mo. ..... —
Alex M. McIver & Son, Charleston, S. C. 67
Mississippi River Chem. Corp., St. Louis, Mo. ..... —
Monarch Mfg. Works, Inc., Philadelphia, Pa. 67
Monsanto Chemical Co., St. Louis, Mo. 44
Munson Mill Machinery Co., Utica, N. Y. 68
National Lime & Stone Co., Findlay, Ohio 17
National Potash Co., New York City ..... Second Cover
Nitro-Form Agricultural Chemicals, Woonsocket, R. I. ..... —
Nitrogen Division, Allied Chemical & Dye Corp., New York City 33–36
Pennsylvania Salt Mfg. Co. of Wash., Tacoma, Wash. ..... —
Phelps-Dodge Refining Corp., New York City ..... —
Phillips Chemical Co., Bartlesville, Okla. 25
Pioneer Pyrophyllite Producer, Torrance, Calif. ..... —
Potash Co. of America, Washington, D. C. ..... Third Cover
Poulsen Co., Los Angeles, Calif. ..... —
Rapids Machinery Co., Marion, Iowa 69
Schmutz Mfg. Co., Louisville, Ky. 40
Shell Chemical Corporation, New York, N. Y. ..... —
Shuey & Company, Inc., Savannah, Ga. 67
Sinclair Chemicals, Inc., New York City ..... —
Sohio Chemical Co., Lima, Ohio 17
Southwest Potash Co., New York City 13
Spraying Systems Co., Bellwood, Ill. 67
Stedman Foundry and Machine Co., Inc., Aurora, Ind. ..... —
Stephens-Adamson Mfg. Co., Aurora, Ill. ..... —
Sturtevant Mill Co., Boston, Mass. 43
Tennessee Corporation, Atlanta, Ga. ..... —
Texas Gulf Sulphur Co., New York City 42
Thomas Alabama Kaolin Co., Baltimore, Md. 23
Tractomotive Corp., Deerfield, Ill. 45
Union Bag-Camp Paper Corp., New York City 31
U. S. Graphite Co., Saginaw, Mich. 19
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla. 15
United States Potash Co., New York City 28
Velsicol Chemical Corp., Chicago, Ill. 1
Wisc. Alumni Research Foundation, Madison, Wisc. 59
Woodward & Dickerson, Inc., Philadelphia, Pa. ..... —

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Directory of Farm Chemicals Manufacturers

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Classified Index to Advertisers in 'Farm Chemicals'

ALDRIN
Ashcraft-Wilkinson Co., Atlanta, Ga.
Shell Chemical Co., Agr. Chem. Div., N.Y.C.

AMMONIA—Anhydrous and Liquor
American Cyanamid Co., New York City
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McIver & Son, Alex. M., Charleston, S. C.

CALCIUM ARSENATE
American Agricultural Chemical Co., N. Y. C.

CALCIUM NITRATE
Atkins, Kroll & Co., San Francisco, Calif.

CAR PULLERS
Stephens-Adamson Mfg. Co., Aurora, Ill.

CARS AND CART
Stedman Foundry and Machine Co., Aurora, Ind.

CASTOR POMACE
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.

CHEMISTS AND ASSAYERS
Shuey & Co., Inc., Savannah, Ga.

CHLOROBENZILATE
Geigy Agr. Chems. Div. Geigy Chem. Corp. N.Y.C.

CHLORDANE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Velsicol Chemical Corp., Chicago' Ill.

CLAY
Ashcraft-Wilkinson Co., Atlanta, Ga.

CONDITIONERS
Ashcraft-Wilkinson Co., Atlanta Ga.
H. J. Baker & Bro., New York City
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Finlay, Ohio
U. S. Graphite Co., Saginaw, Mich.

CONVEYORS
Baughman Mfg. Co., Jerseyville, Ill.
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Finco Inc., North Aurora, Ill.
Joy Mfg. Co., Pittsburgh, Pa.
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Sturtevant Mill Co., Boston, Mass.

COPPER SULFATE
Phelps-Dodge Refining Corp., New York City
Tennessee Corp., Atlanta, Ga

COTTONSEED PRODUCTS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

DDT
Ashcraft-Wilkinson Co., Atlanta, Ga.
Geigy Agr. Chems., Geigy Chem. Corp., N.Y.C.
Monsanto Chem. Co., St. Louis, Mo.

DIAZINON
Geigy Agr. Chems. Geigy Chem. Corp., N.Y.C.

DIELDRIN
Ashcraft-Wilkinson Co., Atlanta, Ga.
Shell Chem. Corp., Agr. Chem. Div., N.Y.C.

DILUENTS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.

DITHIOCARBAMATES
Berkshire Chemicals, New York City

ELEVATORS
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.
Stephens-Adamson Mfg. Co., Aurora, Ill.

ENDRIN
Shell Chem. Corp., Agr. Chem. Div., N.Y.C.
Velsicol Chemical Corp., Chicago, Ill.

ENGINEERS—Chemical and Industrial
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

FERTILIZER—Liquid
Clover Chemical Co., Pittsburgh, Pa.

FERTILIZER—MIXED
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Co., div. of W. R. Grace & Co., Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.

FILLERS
Bradley & Baker, N. Y. C.

Fish SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

FULLER'S EARTH
Ashcraft-Wilkinson Co., Atlanta, Ga.

FUNGICIDES
American Agricultural Chemical Co., N. Y. C.
Berkshire Chemicals, New York City
Tennessee Corp., Atlanta, Ga.

HEPTACHLOR
Velsicol Chemical Corp., Chicago, Ill.

HERBICIDES
American Cyanamid Co., New York City
American Potash & Chemical Corp., Los Angeles, California
Monsanto Chem. Co., St. Louis, Mo.

HOPPERS & SPOUTS
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Berkshire Chemicals, New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

KAOLIN
Thomas Alabama Kaolin Co., Baltimore, Md.

INSECTICIDES
American Agricultural Chemical Co., N. Y. C.
American Cyanamid Co., New York City
American Potash & Chemical Corp., Los Angeles, California
Ashcraft-Wilkinson Co., Atlanta, Ga.
Berkshire Chemicals, New York City
Fairfield Chem. Div., Food Mach. & Chem. Corp., New York City
Geigy Agr. Chems., Div. Geigy Chem. Corp., N.Y.C.
Pennsylvania Salt Mfg. Co., of Wash., Tacoma, Wash.
Shell Chem. Corp., Agr. Chem. Div., N.Y.C.
Velsicol Chemical Corp., Chicago, Ill.

IRON CHELATES
Geigy Agr. Chems., Div. Geigy Chem. Corp., N.Y.C.
Tennessee Corp., Atlanta, Ga.

IRON SULFATE
Tennessee Corp., Atlanta, Ga.

LABORATORY SERVICES
Wisc. Alumni Research Foundation, Madison, Wisc.

LEAD ARSENATE
American Agricultural Chemical Co., N.Y.C.

LIMESTONE
American Agricultural Chemical Co., N.Y.C.
Ashcraft-Wilkinson Co., Atlanta, Ga.
National Lime & Stone Co., Finlay, Ohio

MACHINERY—Acid Making and Handling
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Acidulating
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Grinding and Pulverizing
Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Bradley Pulverizer Co., Allentown, Pa.
Finco Inc., North Aurora, Ill.
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

Buyers' Guide

MACHINERY—Material Handling

Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Clark Equipt. Co., Construction Mach. Div., Benton Harbor, Mich.
Finco Inc., North Aurora, Ill.
Hough, The Frank G. Co., Libertyville, Ill.
Joy Mfg. Co., Pittsburgh, Pa.
Link-Belt Co., Chicago, Ill.
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora Ind.
Stephen-Adamson Mfg. Co., Aurora, Ill.
Sturtevant Mill Co., Boston, Mass.
Tractomotive Corp., Deerfield, Ill.

MACHINERY—Mixing and Blending

Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Munson Mill Mach. Co., Utica, N. Y.
Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Mixing, Screening and Bagging

Poulsen Co., Los Angeles, Calif.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Power Transmission

Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY Superphosphate Manufacturing

Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MALATHION

American Cyanamid Co., New York City

MAGNESIUM SULFATE

Berkshire Chemicals, New York City

MANGANESE SULFATE

Tennessee Corp., Atlanta, Ga.

MANURE SALTS

Potash Co. of America, Washington, D. C.

METHOXYCHLOR

Geigy Agr. Chems., Div. Geigy Chem. Corp. N.Y.C.

MINOR ELEMENTS

Geigy Agr. Chems., Div. Geigy Chem. Corp., N.Y.C.
Tennessee Corporation, Atlanta, Ga.

MIXERS

Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Munson Mill Mach. Co., Utica, N. Y.
Rapids Machinery Co., Marion, Iowa
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

NITRATE OF POTASH

Berkshire Chemicals, New York City

NITRATE OF SODA

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
McIver & Son, Alex. M., Charleston, S. C.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
International Min. & Chem. Corp., Chicago, Ill.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NITROGEN SOLUTIONS

American Cyanamid Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
Commercial Solvents Corporation, New York City
Escambia Chem. Corp., Pensacola, Fla.
Lion Oil Company, El Dorado, Ark.
Mississippi River Chem. Co., St. Louis, Mo.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Phillips Chemical Co., Bartlesville, Okla.
Sinclair Chemicals, Hammond, Ind.
Sohio Chemical Co., Lima, O.

NITROGEN MATERIALS—Organic

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Sons, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES—Spray

Monarch Mfg. Works, Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

PARATHION

American Cyanamid Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
Monsanto Chem. Co., St. Louis, Mo.

PHOSPHATE ROCK

American Cyanamid Co., New York City
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

PHOSPHORIC ACID

American Agricultural Chemical Co., N. Y. C.

PLANT CONSTRUCTION—Fertilizer and Acid

Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Link-Belt Co., Chicago, Ill.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston Mass.

POTASH—Muriate

American Potash & Chemical Corp., Los Angeles, California
Ashcraft-Wilkinson Co., (Duval Potash) Atlanta, Ga.
Bradley & Baker, N. Y. C.
Duval Sulphur & Potash Co., Houston, Tex.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
National Potash Co., N. Y. C.
Potash Co. of America, Washington, D. C.
Southwest Potash Corp., New York City
United States Potash Co., N. Y. C.

POTASH—Sulfate

American Potash & Chemical Corp., Los Angeles, California
International Min. & Chem. Corp., Chicago, Ill.
Potash Co. of America, Washington, D. C.

PRINTING PRESSES—Bag

Schmutz Mfg. Co., Louisville, Ky.

PYROPHYLLITE

Ashcraft-Wilkinson Co., Atlanta, Ga.
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.

REPAIR PARTS AND CASTINGS

Stedman Foundry and Machine Co., Aurora, Ind.

SCALES—Including Automatic Baggers

Exact Weight Scale Co., Columbus, O.
Stedman Foundry and Machine Co., Aurora, Ind.

SCREENS

Blue Valley Equipt. Mfg. & Eng. Co., Topeka, Kans.
Finco Inc., North Aurora, Ill.
Ludlow-Saylor Wire Cloth Co., St. Louis, Mo.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

SHOVEL LOADERS

Clark Equipt. Co., Benton Harbor, Mich.
Hough, The Frank G. Co., Libertyville, Ill.
Tractomotive Corp., Deerfield, Ill.

SOILTEST EQUIPMENT

The Edwards Laboratory, Norwalk, O.

SPRAYERS

Finco, Inc., N. Aurora, Ill.

SPRAYS

Monarch Mfg. Works, Inc., Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.
Baughman Mfg. Co., Jerseyville, Ill.

SPREADERS, TRUCK

Baughman Manufacturing Co., Jerseyville, Ill.
Highway Equipment Co., Cedar Rapids, Ia.

STORAGE TANKS

Cole, R. D., Manufacturing Co., Newnan, Ga.

SULFATE OF AMMONIA

American Cyanamid Co., New York City
American Agricultural Chemcal Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Jackle, Frank R., New York City
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C
Phillips Chemical Co., Bartlesville, Okla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFATE OF POTASH—MAGNESIA

International Min. & Chem. Corp., Chicago, Ill.

SULFUR

Ashcraft-Wilkinson Co., Atlanta, Ga.
Texas Gulf Sulphur Co., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFUR—Dusting & Spraying

Ashcraft-Wilkinson Co., Atlanta, Ga.
U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla.

SULFURIC ACID

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

SUPERPHOSPHATE

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
Davison Chemical Co., div. of W. R. Grace & Co., Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SUPERPHOSPHATE—Concentrated

Armour Fertilizer Works, Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Phillips Chemical Co., Bartlesville, Okla.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TALC

Ashcraft-Wilkinson Co., Atlanta, Ga.

TANKAGE

American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Bradley & Baker, N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TANKS—NH3 and Liquid N

Cole, R. D., Manufacturing Co., Newnan, Ga.

TOXAPHENE

Ashcraft-Wilkinson Co., Atlanta, Ga.

TRUCKS—SPREADER

Baughman Mfg. Co., Jerseyville, Ill.
Highway Equipment Co., Cedar Rapids, Ia.

UREA & UREA PRODUCTS

Atkins, Kroll & Co., San Francisco, Calif.
Bradley & Baker, N. Y. C.
Grand River Chem. Div., Deere & Co., Tulsa, Okla.
Nitrogen Div. Allied Chemical & Dye Corp., N.Y.C.
Sohio Chemical Co., Lima, O.

UREA-FORM

Nitro-Form Agricultural Chemicals, Woonsocket, R. I.

VALVES

Monarch Mfg. Works, Inc., Philadelphia, Pa.

ZINC SULFATE

Tennessee Corp., Atlanta, Ga.

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